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(54) **WEB-DRIVEN CALENDAR UPDATING SYSTEM**

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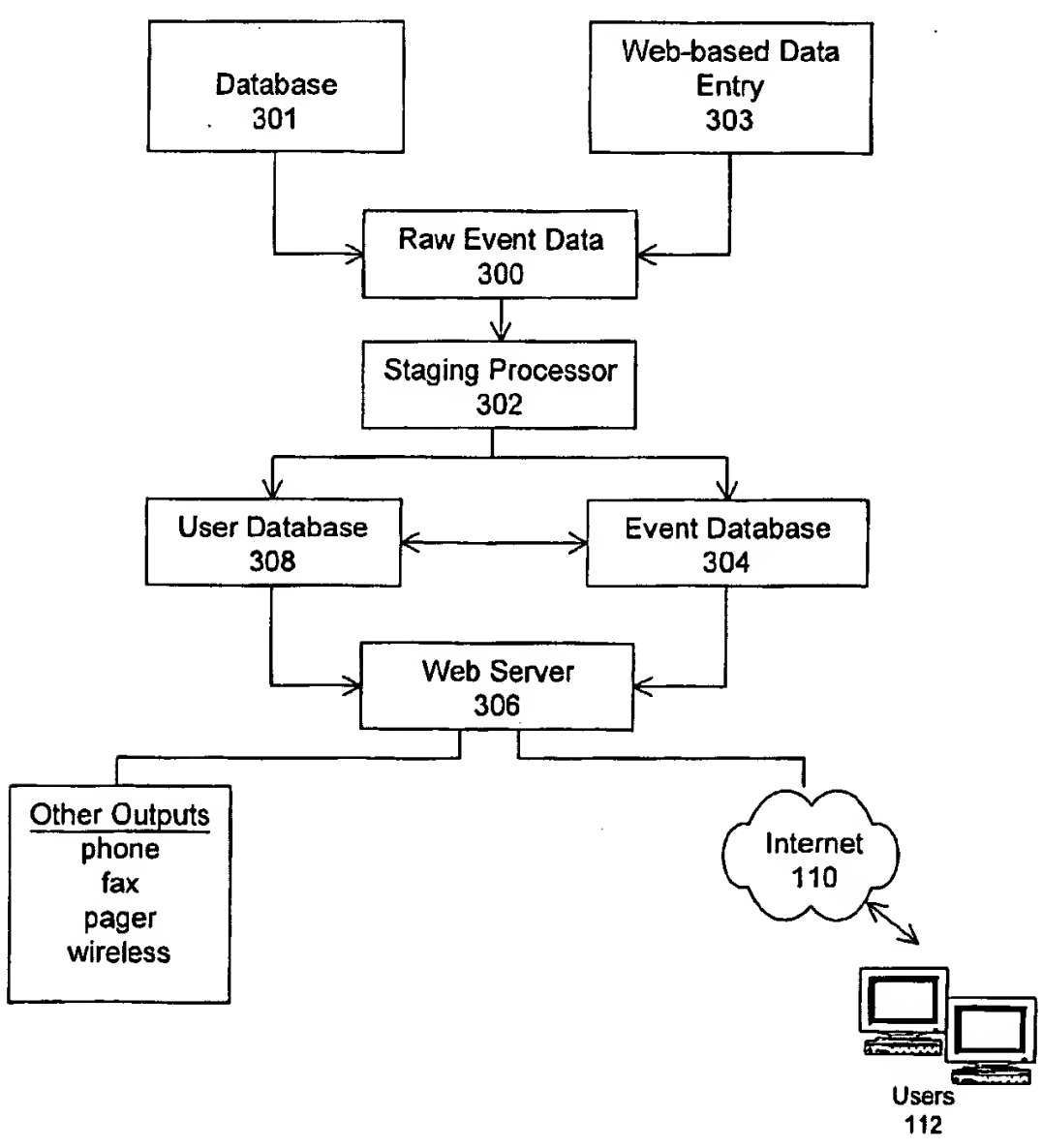
(57) **ABSTRACT**

An event scheduling system which allows a user to request reminders of upcoming events over the Internet. The user may request to be reminded about a specific event or he may request to be reminded of events that meet a certain criteria. The reminders automatically update the user's electronic calendar if requested by the user. The reminders may also notify the user of the event by a variety of different media. The reminders may also automatically update the user's calendar as a result of changed data event.



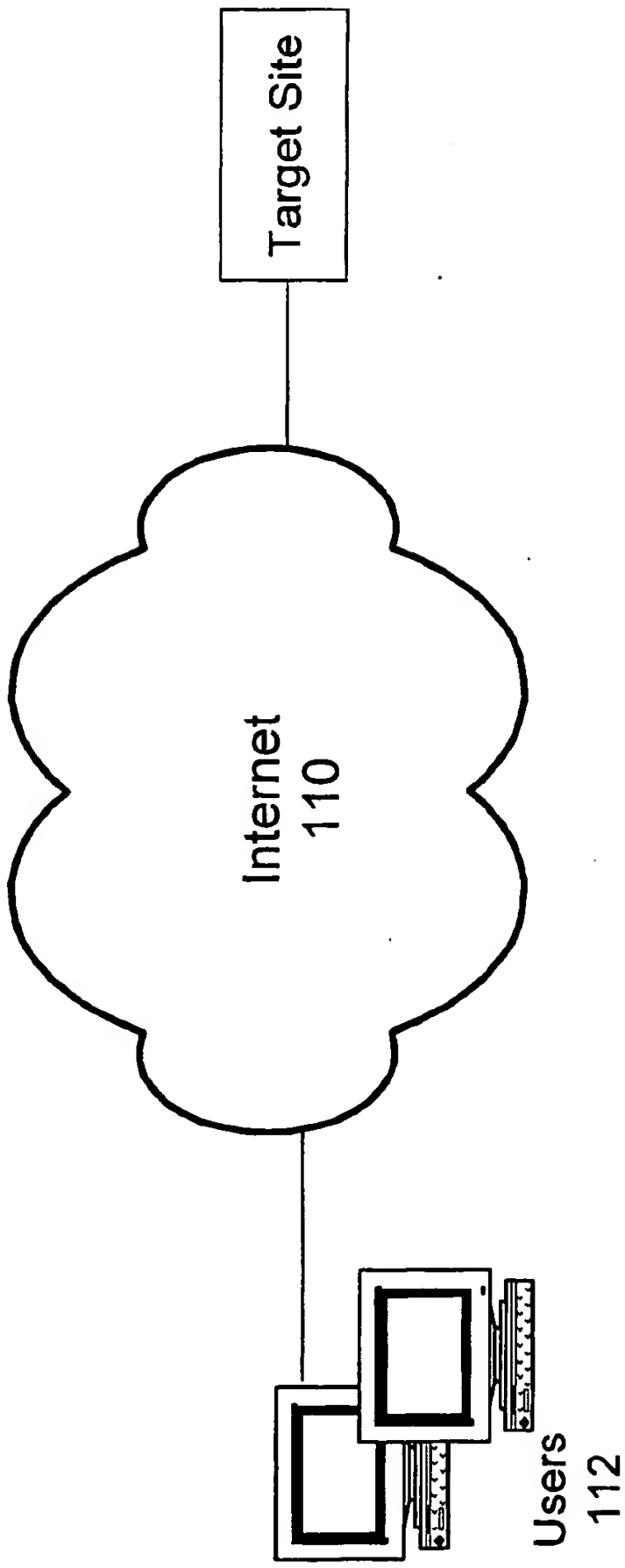


Figure 1

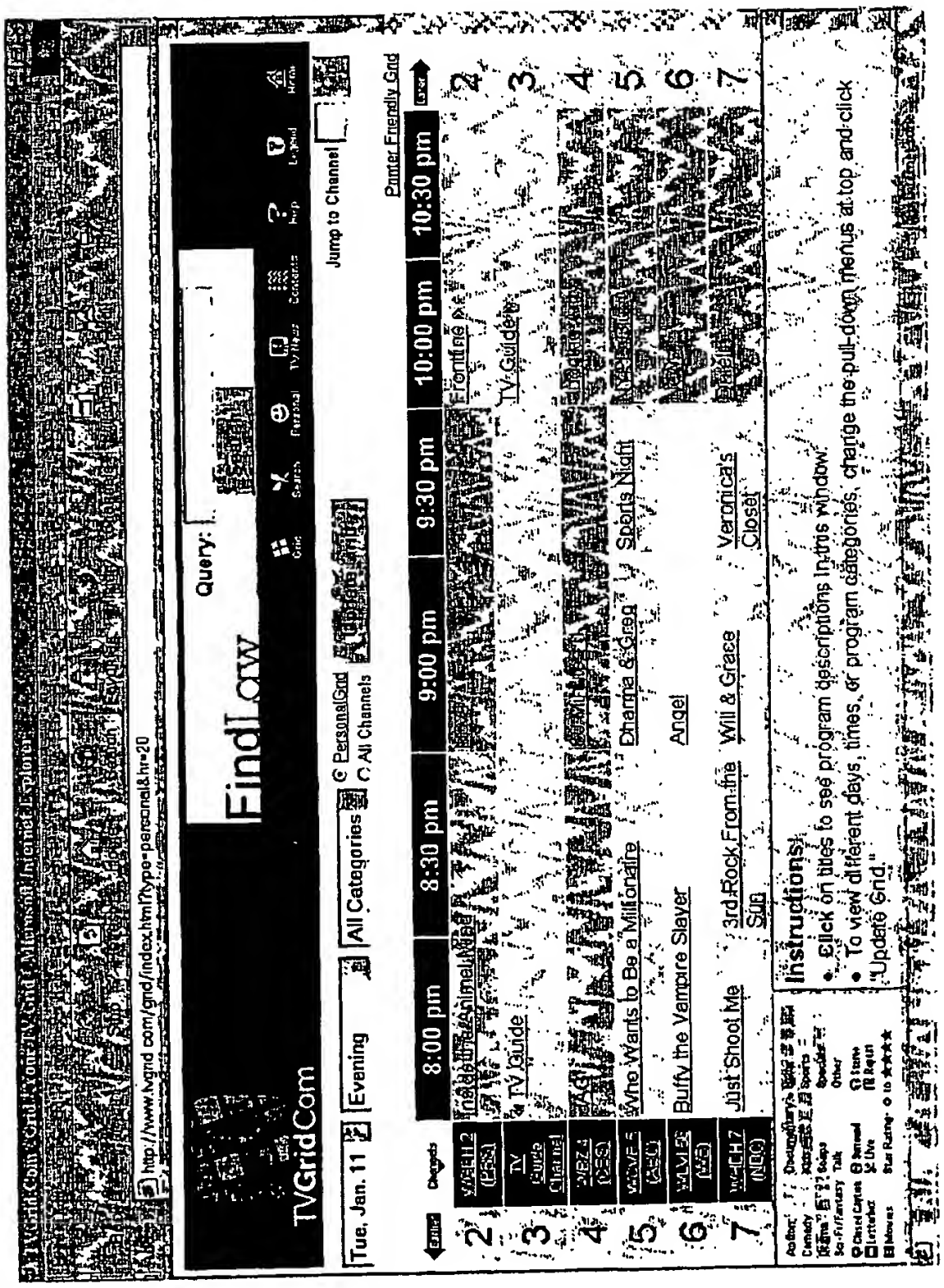

TVGridCom
Find
Query:
Search
Jump to Channel
Printer Friendly Grid
Tue, Jan. 11
Evening
All Categories
8:00 pm
8:30 pm
9:00 pm
9:30 pm
10:00 pm
10:30 pm
Frontline
TV Guide
Sports Night
Dharma & Greg
Angel
Will & Grace
Veronica's Closet
Who Wants to Be a Millionaire
Buffy the Vampire Slayer
Just Shoot Me
3rd Rock From the Sun
Instructions:
Click on titles to see program descriptions in this window.
To view different days, times, or program categories, change the pull-down menus at top and click "Update Grid."

Figure 2

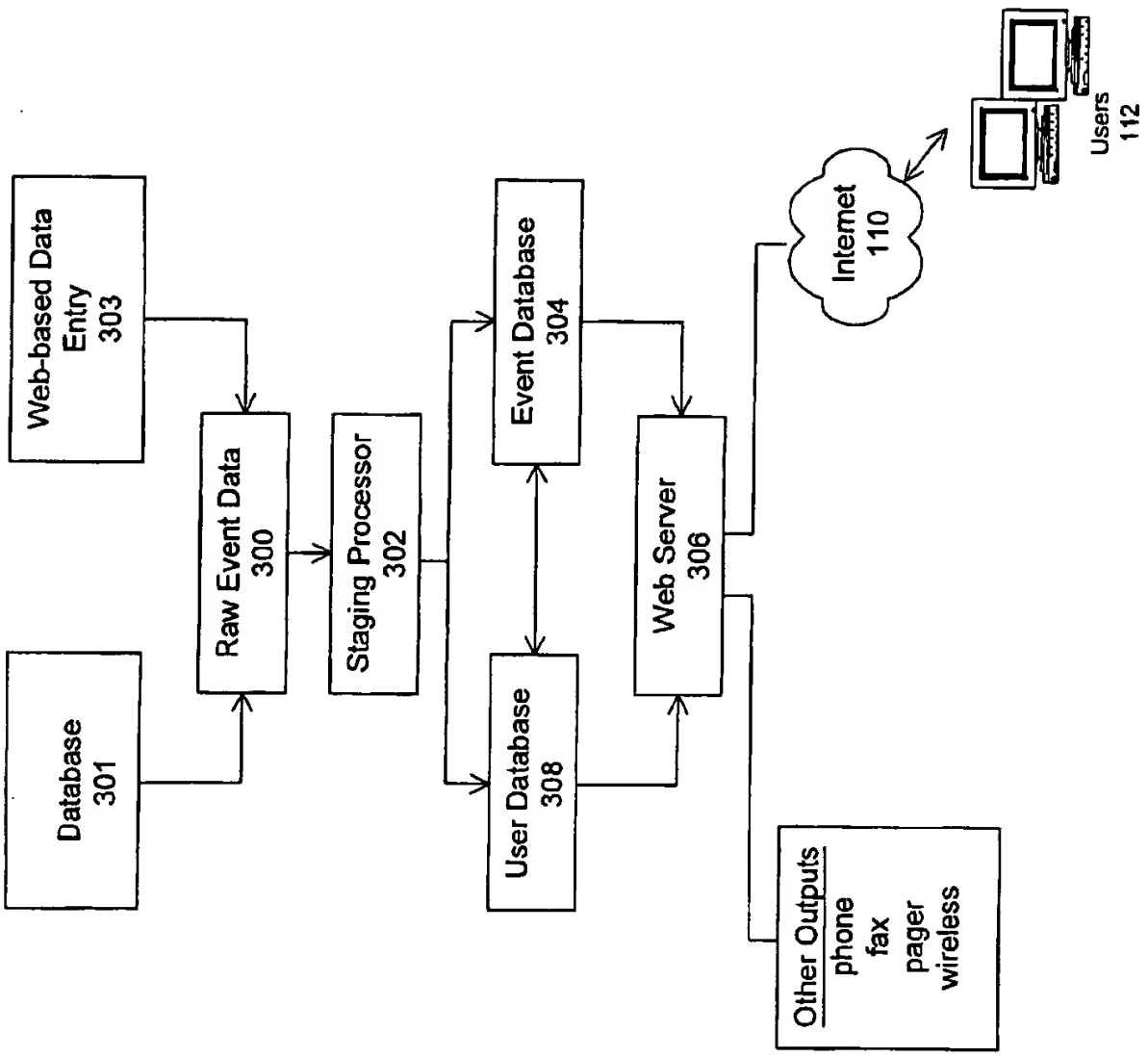

Web-based Data Entry 303
Database 301
Raw Event Data 300
Staging Processor 302
Event Database 304
User Database 308
Web Server 306
Internet 110
Users 112
Other Outputs
phone
fax
pager
wireless

Figure 3

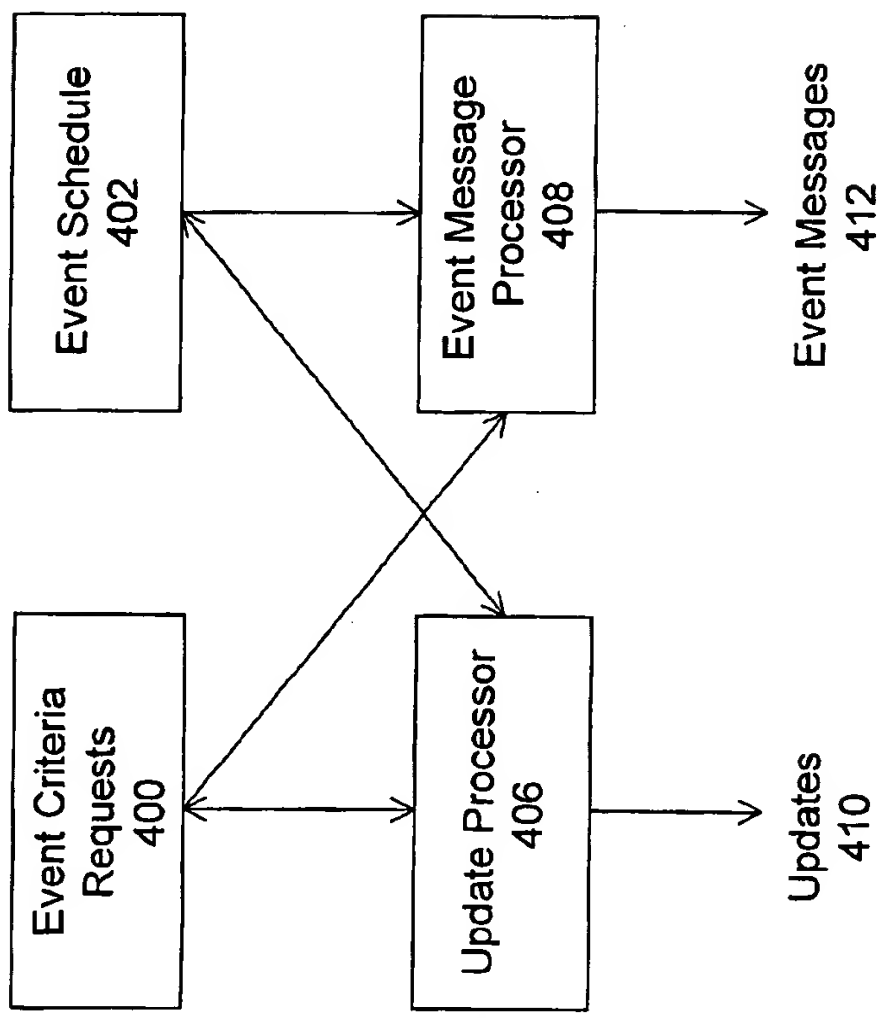

Event Schedule 402
Event Message Processor 408
Event Messages 412
Event Criteria Requests 400
Update Processor 406
Updates 410
Schedule Changes 404

Figure 4

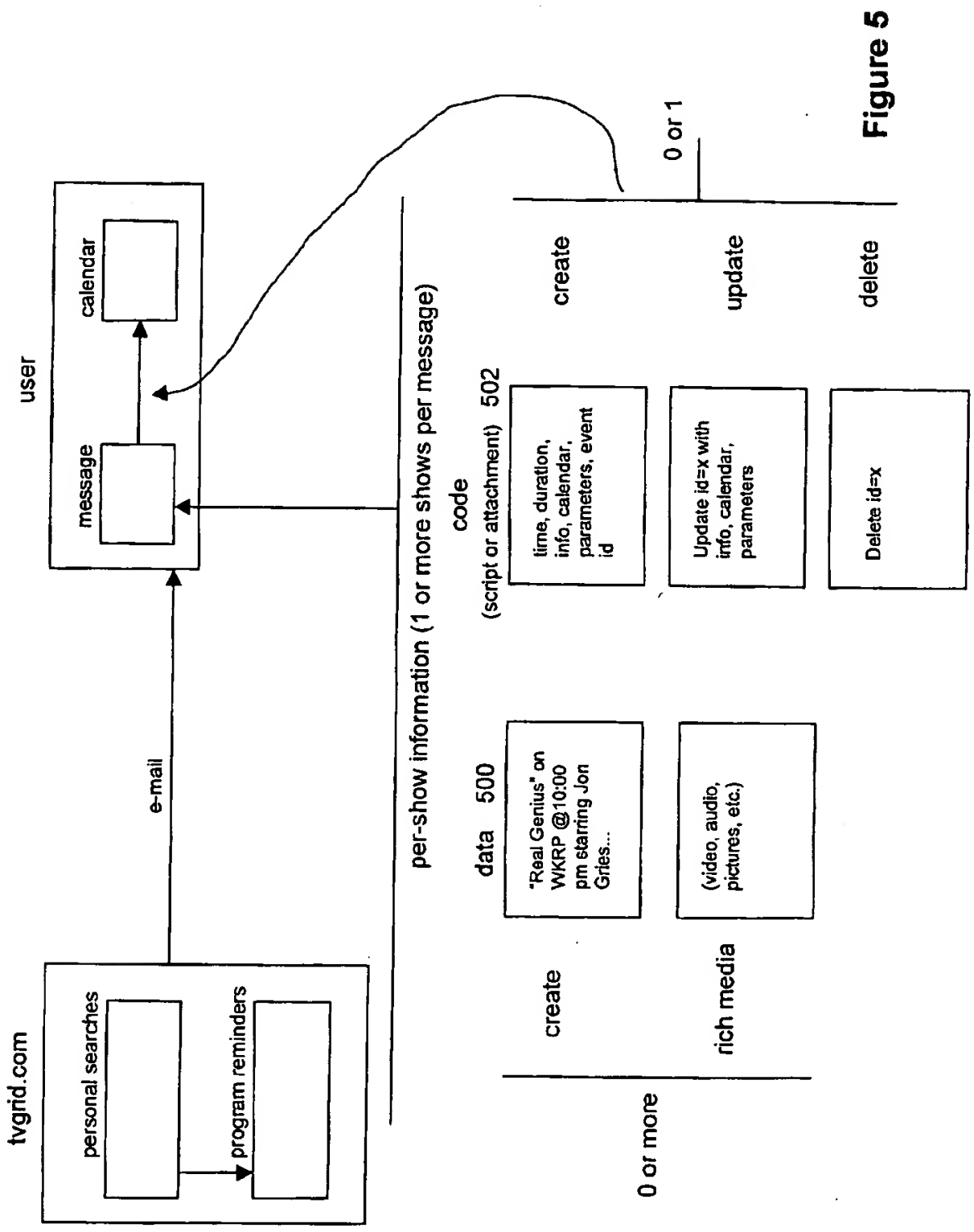

user
calendar
message
e-mail
tvgrid.com
personal searches
program reminders
per-show information (1 or more shows per message)
code
(script or attachment) 502
create
update
delete
0 or 1
time, duration, info, calendar, parameters, event id
Update id=x with info, calendar, parameters
Delete id=x
data 500
"Real Genius" on WKRP @10:00 pm starring Jon Gries...
(video, audio, pictures, etc.)
create
rich media
0 or more

Figure 5

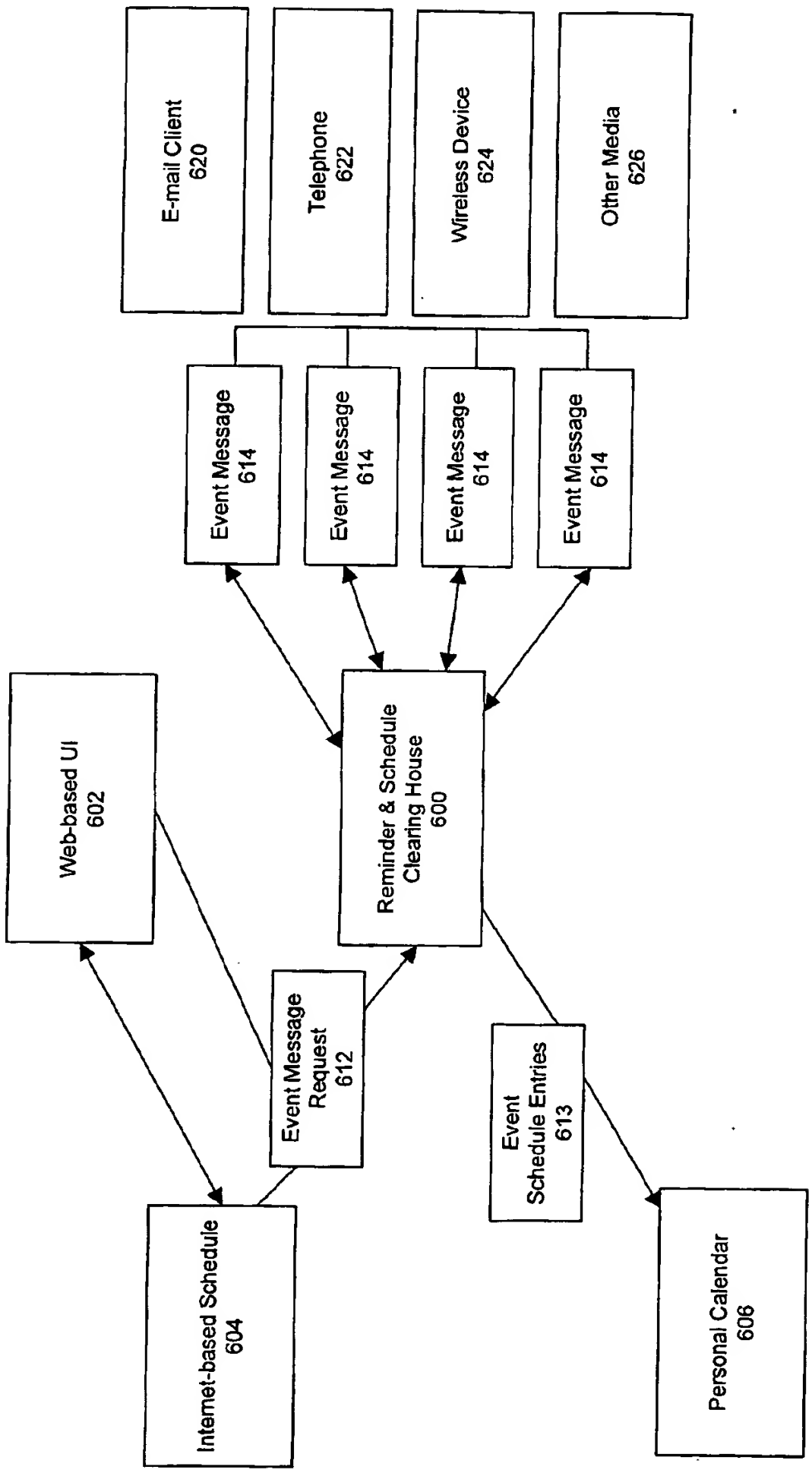

E-mail Client
620
Telephone
622
Wireless Device
624
Other Media
626
Event Message
614
Event Message
614
Event Message
614
Event Message
614
Web-based UI
602
Reminder & Schedule
Clearing House
600
Event Message
Request
612
Event
Schedule Entries
613
Internet-based Schedule
604
Personal Calendar
606

Figure 6

WEB-DRIVEN CALENDAR UPDATING SYSTEM

RELATED APPLICATION

[0001] This application claims the benefit under 35 U.S.C. 119 of the filing date of the provisional application with Ser. No. 60/184,669, filed Feb. 24, 2000.

FIELD

[0002] This invention relates to computer-based calendaring systems.

BACKGROUND

[0003] The Internet provides access to schedules that display pre-planned events. These events include meetings, shows, classes, television programs, lectures, seminars or other happenings that may be of interest to the general public or a selected population. These schedules of events are typically posted on the Internet available at a website for a given time period and venue and are intended for viewing by a visitor to the website.

[0004] Some of the Internet-provided schedules also provide a service of sending an email to a user who has requested to be reminded of the occurrence of a pre-selected event. Users may also request notification of items or events that meet a certain criteria. Programs known as web agents are available to constantly search through the web to notify a user, usually by email, of items that meets the user's criteria.

[0005] However, these notification systems are limited because the intended recipient must be at his/her computer/web service in order to receive and acknowledge the reminder.

SUMMARY

[0006] Disclosed below is a method of sending an event message for a scheduled event comprising a client system capable of sending an event message request including a set of event criteria to a server system capable of receiving the request, matching the event criteria with event data and sending at least one event message containing event information for an event whose data matches the event criteria to a recipient system. The server system may store the request for further processing.

[0007] In one embodiment, a system for sending event messages may generate different types of messages (such as e-mails, instant messaging messages, spoken audio, pager messages, calendar entries, and so on) using different media (such as the internet, wireless transmission, the telephone system, and so on) for different purposes (such as notifying about a new event or a change in an existing event, reminding of an event already known about, or instructing a devise attached to a receiving client to take some action). The messages may have a command piece which may cause a device associated with the receiving client to take some action (such as placing an entry in a calendar database, may operate an audio/visual device (including without limitation, display, decoding, and recording devices), may allow a transaction (such as a purchase) to be completed, or may allow a receiving client or its user to reply to the message.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The discussion below will be better understood by referencing the following figures:

[0009] **FIG. 1** shows a typical connection of a user computer to a target site;

[0010] **FIG. 2** shows a schedule of TV programs;

[0011] **FIG. 3** is a top level diagram of a web based calendaring system;

[0012] **FIG. 4** is a diagram of one method of generating calendar schedules according to the present invention;

[0013] **FIG. 5** shows a typical email event message and calendar update; and

[0014] **FIG. 6** shows an alternative embodiment of the event message processing system.

DETAILED DESCRIPTION

[0015] Users may select from myriad sites that are viewable over the Internet or via other computer networks using a computer, portable device or other method. The user accesses the target sites over the Internet (or an intranet) and information is relayed from the site to the user as generally shown in **FIG. 1**. Often the sites are interactive, taking input from the user as well as outputting information. Many services are available to users over a network such as purchasing goods, paying bills, or participating in group discussions.

[0016] Two example systems available to users over a network are computerized personal calendaring and scheduling systems. Examples of these range from desktop based Microsoft® Outlook to ubiquitous personal digital assistants. Further, many Internet portals, for example, Yahoo! and Lycos, provide calendars that a user may access from anywhere access to the World Wide Web is available. These systems and devices allow users to receive email and schedule appointments and reminders for later recall, display, or printing. In the case of the Internet-based calendars, these reminders may be delivered by email. They also allow individuals to schedule group meetings with a set of specifically named individuals.

[0017] However, these personal calendaring systems are limited because they are personal: they do not draw information from publicly-posted event schedules, nor do they facilitate meetings among a group of individuals defined solely on their common interests. Further, reminders from this system consist solely of emails or pop-up windows displayed on the PC where the calendar is active.

[0018] A further limitation of these calendaring systems is evident when event data changes. If a user creates an appointment in a calendaring system it is that user's responsibility to make sure that the event data is current and has not changed. If the event data does change (such as a time/date change, location change, or content change) the user is not notified and will therefore have an appointment on his/her calendar with incorrect data.

[0019] A system for requesting, creating and updating event messages which may include calendar entries from an event schedule accessible by a computer network (such as the Internet) is described below. A user accesses the schedule and requests an event message to be sent to him/her based on a set of criteria determined by the user. The event message may be in several different forms, including, without limitation, calendar entries, pages, faxes or wireless

updates. The event schedule system displays events to the user and may insert an event into the user's calendar either automatically or at the user's request. The system may also perform other scheduling functions.

[0020] The following describes a particular embodiment of an event schedule, the presentation of television program information in a grid. The system is equally applicable to other events and venues such as, but not limited to, public or private events, artistic events, sporting events, campus events, on-line events, broadcast events, etc. The explanation with respect to television event listings is used for ease of explanation and is not intended to be limiting. The calendaring system may be used with any manner of event.

[0021] The service through which users may take advantage of the calendaring system is an event listing service. For example, a user visits a television program listing web site, enters personal data, and is able to view a schedule of events or programs that are available to the user at different times. Television programming varies geographically, and by service provider. Therefore, when the user accesses the site, and enters his/her zip code and television service provider, the user has access to a listing, usually in a grid form, of the programs that are to be broadcast in that particular area by the user's service provider. **FIG. 2** shows an example of what a user might see when accessing the TVGrid.com web site of TV Grid, Inc. of Boston, Mass. Each program is listed, showing the channel and the time it will be broadcast. The programs may be color-coded to indicate a particular category of program and the title of each show provides a hypertext link which the user may follow to obtain more information about the program. Each program is listed inside a block which occupies the space in between the marked times during which the show will be broadcast.

[0022] For example, referring to **FIG. 2**, channel **7** (WHDH 7 NBC) will show five different programs from 8 PM until 11 PM. The first four of those shows are half-hour long programs and the last is a full hour.

[0023] The user may interact with the site to obtain program information for different channels, different television providers, different days, and different categories of viewing.

[0024] The user may request that the calendaring system remind the user when a certain program is to be broadcast or even to schedule the broadcast of the program into the user's electronic calendar. The user may also request that the calendaring system notify the viewer when programs matching certain user-selected event criteria are scheduled to be broadcast. The event criteria selected by the user may include one or more selection categories. For example, the user may select criteria based on a particular actor, a particular theme (such as science fiction programs), director, or other criteria that define a class of event that the user is interested in. Event criteria may also be combined to create a more specific event (e.g., science fiction films directed by Steven Spielberg).

[0025] One exemplary embodiment of the web based calendaring system is shown in **FIG. 3**. Raw event data **300**, collected from either a data source database **301** or through a web-based event information entry system **303**, is sent to a staging processor **302**. The staging processor **302** then formats and analyzes the event data as necessary into a desired scheme so that it may be retrieved. The formatted data is then sent to an event database **304** where it may be accessed by a web server **306**. A user **112** connects to the web server **306** over the Internet **110**. The user **112** interacts with the web server **306** and views the event data. User information is stored in a user database **308** that interacts with the web server **306**. User profiles, calendar requests, notification requests, and other information are stored in the user database **308**. At appropriate times, the web server **306** sends the appointments or notifications to the user **112** over the Internet **110** or through an external output **314** which connects with other media, for example: telephone, fax machine, pager, wireless device, personal digital assistant, calendar event scheduling protocols, etc. The system may operate in a client server model or in other models such as a peer to peer environment with no centralized server. The peer to peer model may combine machines to form a generating system from which requesting systems would receive event messages.

[0026] The calendaring system is capable of providing a number of customizable options to the user. These options may include potential reminder time, preferred reminder media, type of calendaring system or other information, which will enhance a user's interaction with the system. In order to facilitate interaction with the calendar updating system, users are encouraged to provide this particular information to the system so that the system may customize the options accordingly. The system may then leave an amount of data such as a "cookie" on the user's computer so that the user is easily identifiable by the system the next time the user makes use of the system. The system may then identify the user and then reference the user database **308** that stores the preferences and information for each user.

[0027] There are two ways a user may request event messages. The first way is by requesting a reminder for a particular program. This type of reminder may be requested by following a link directly from the public events schedule, or by entering the particular event in a search request query. The second way a user may request an event message is by entering an event criteria request. To do this, the user enters a search query screen (by following the appropriate link on the calendaring system web site) and enters a set of criteria, which match the kinds of programs the user wishes, as described above. The resulting event message requests from either method are stored in the user database **308**. A program run by the staging processor **302** regularly searches for any unfulfilled event message requests and sends them at the appropriate time. A program also identifies new event message requests to be executed.

[0028] The event schedule may offer links for each event listed which allow the user to automatically request a reminder for that particular event.

[0029] The criteria requests are handled by the system as described below. A user describes a search for events based on the user's criteria. That search is then generated and put into a list of personal searches stored by the user database **108**. Those personal searches are used to generate reminders for events stored in the system. The reminders are then compiled and stored together. At the appropriate time as defined by the calendaring system (or by the user's preferences) the reminder is sent to the user in an event message. The event message is either sent by email, telephone, or by any other system capable media.

[0030] The preferred method of generating event messages based on a set of criteria entered by the user is shown in **FIG. 4**. Event criteria requests entered by users are stored together **400**. The events are also stored in a master schedule **402**. The event message processor **408** checks the criteria requests against the event schedule and generates event messages **412** that will be sent to users. Sometime the event schedule **402** changes due to alterations in event data (such as a program time change, subject change or deletion). These schedule changes **404** may come from the program originator or broadcaster. Schedule changes **404** are handled by an update processor **406**. The update processor **406** takes the new schedule information and checks it against the event criteria requests **400**. The update processor also may check new schedule information against reminders requested for a particular event. If any users have requested notification about events that have been modified, or otherwise affected by other modified events, the update processor generates updates **410** that will be sent to users.

[0031] In one embodiment, the calendaring system may transmit different types of event messages. One type is a notification, where the system sends a message the user informing him/her of an newly scheduled or changed upcoming event which meets certain criteria. A second type of message is a reminder, where the system sends a message to the user at a time proximate to the occurrence of the event to bring the event to the forefront of the user's mind. The third type of message is an event schedule entry where the system puts an entry into the user's electronic personal calendar system indicating the time and location of the selected event. The personal calendar system holds the event data so the user may view it in the context of an overall personal schedule. The fourth type is a message with instructions or a command piece attached. An event message may be of any one or more of these types.

[0032] The event schedule entry sends an entry to the user's electronic calendar indicating the time and location of the event. There are two types of calendar entries that the user may request from the system. The first type allows the user to accept or decline the calendar entry when it is sent to the user's electronic calendar and the second allows the system to automatically schedule the entry without the user needing to acknowledge the scheduling of the entry after it is requested. The advantages of the accept/decline option include the user's ability to cancel the entry before it is entered into his calendar, and gives the user another reminder of the upcoming event. The advantages of automatically scheduling the entry include speed and no time lost by the user acknowledging the calendar entry.

[0033] The user may indicate what kind of calendar the user has so the system may send the event schedule entry in the proper format. The user may also choose by what media an event message is to be sent (fax, voice, wireless, etc.). When the calendaring system sends the event message it may also send a command piece which causes the email/calendaring system to create an appointment or event item in the calendar.

[0034] The command piece may be a client-side script in an HTML-enabled or other type of active content message. For example, the message may have some VBScript or Javascript that instantiates ActiveX objects on the client or uses some other interface exposed by the email/calendaring system to pass the necessary information.

[0035] The command piece may also be a MIME (or other attachment scheme) attachment to the email message that the email/calendaring system recognizes and interprets. This attachment may be a client-side script or some other format, possibly proprietary to a specific calendar system. vCalendar is a standard data format of this type recognized by, among others, Microsoft calendaring products including Outlook.

[0036] The command piece may cause one or more reminders to be scheduled, updated, or deleted. The scheduled reminders may each contain a token that uniquely identifies that reminder. This token may be used for updating or deleting that specific reminder in future-sent command pieces, based on updates to the event data.

[0037] The command piece may also contain information that controls how the reminder is handled by the user's email/calendaring system, e.g., how soon before the event the system is to remind the user, how many times to remind the user, etc.

[0038] Event schedule entries may be sent via email, Internet, telephone, pager, or other wire based or wireless device depending on the preferences of the user and his type of electronic calendar.

[0039] The event schedule entries may also have features that give the user flexibility when scheduling events. For example, if the user is busy during an event that the calendaring system tries to schedule, the user may indicate to the calendaring system to attempt to schedule the next occurrence of the event, or, alternatively, the next occurrence of the event where the user has no other events scheduled. The user may also indicate to the calendaring system that he wishes to schedule other individuals for the same event. The calendaring system may then automatically send calendar entries to those individuals depending on whether or not the calendaring system has the proper formatting information, or may contact them via different mechanisms to notify them of the event. If authorized to by the user, the calendaring system may also, without prompting by the user, schedule alternate event entries if a conflict with the initial entry exists.

[0040] The system may also provide reminder support for various personal calendaring systems. Microsoft Outlook is an example of a personal calendar system which supports reminders of the nature of reminders contemplated here. A personal calendar could request that the system send a reminder of a personal event to the calendar owner or to others. **FIG. 5** shows one format for an email event message. The data **500** contains user viewable event data. The event message may also include attachments such as video data, audio data, pictures, links to other events or web pages, etc. These attachments may contain a variety of information. They may be specific to the event (such as concert details, notes on actors, etc.) or may be general in nature (such as a review of the user's events scheduled through the system). The data **500** may contain no user viewable information or may include a variety of such information depending on the system configuration and the user's preferences when the reminder was requested. The code **502** may contain the appointment or event to be inserted into the user's calendar program. If the email is only for reminder purposes then no code may be necessary. If, however, the user's calendar is to be changed, the code may perform one or more of the following: create a new entry in the calendar, update an

existing entry, or delete an existing entry. The actual commands used to perform this operation may depend on the calendar of the user.

[0041] If the data for the event changes before the event occurs, but after the calendar entry or a reminder has been sent, the system may automatically update the calendar entry and send a new reminder with the corrected data. The correction to the calendar entry, like the original calendar entry may be either an accept/decline entry, which allows the user to decide whether to incorporate the correction into his calendar, or the correction may be automatic, such that no action is required on the user's part to correct the data in the calendar entry. The calendaring system may also delete the previous reminder, if unread by the user or if it has already been read, the calendaring system may send an update **410** to the user notifying the user of the corrected information.

[0042] Furthermore, the user may indicate that he/she wishes to receive the event message (either original or corrections) in a form other than email or calendar. The user may prefer to receive it via fax, voice mail, pager, any other medium or combination thereof. The calendaring system may send the event message in the appropriate form at the appropriate time.

[0043] The option to be reminded via an alternate media may be available by replying to the reminder, but may also be activated while interacting with the main system. The user may, in his/her preferences, notify the system to check the user's personal calendar system for availability before determining the media over which to send the event message at the requested time. For example, if the user is at home, a phone message may be preferable; if at work, an email; if on the road, a wireless message, etc.

[0044] An alternate embodiment for the reminder and calendar event scheduler is shown in **FIG. 6**. In this embodiment, one central system, the clearinghouse server **600**, handles all event message requests **612** and also processes the event messages **614**. A user interacts with the web-based user interface **602** to access the Internet based schedule **604**. After reviewing the schedule, the user sends an event message request **612** to the central processing system **600**. The system may then send event schedule entries **613** to the user's personal calendar **606** if desired by the user. The system also sends the event message **614** over the appropriate medium as requested by the user. These messages may be sent to an email client **620**, to a telephone **622**, to a wireless device **624**, or to another media receptacle **626**. The event message may be sent to a different location from the requesting system.

[0045] The system may send event messages along any of one or more different media. The user selects, either in the setting of initial preferences, or when the user requests the event message, how the user prefers to receive event messages. The messages may come via phone message over a telephone line, a facsimile over a facsimile machine, a message over a pager, by email, to a personal digital assistant (PDA), directly to other wireless devices, etc. For each of the different media options the user may choose, the system will format the message accordingly and will send it to the user.

[0046] These messages may include other information in addition to the reminder for the specific event. For example, for a reminder regarding a television program, the reminder may include content related to the program. This content may be advertisements, previews of related shows or other multimedia content. In the case of phone or voice mail the reminder may include a pre-recorded or pre-generated (or assembled) voice message which may be in the voice of one of the actors of the particular show. A facsimile reminder may contain a picture of the actors of the program. In the case of email, other items may be included, for example, audio clips, video clips, trailers for upcoming programs, or links to related sites.

[0047] Many computers have the capability to show television programs. The event message may include a command script for activating an audio visual device such as a television or a television receiver on a computer when the program is scheduled to be broadcast, or alternatively, to activate a device to record the program at the scheduled time.

[0048] The event messages may also include extra features such as a snooze feature that allows the user to indicate to the system that he wishes to receive another event message regarding the program in the future. Furthermore, the user may indicate that the system should forward the message to a different telephone number, email, wireless device, pager, etc. that the user requests. This could be used to forward the reminder to a friend, or to send the reminder to a location the user finds more desirable. These features are easily incorporated into the different media. For example, for a telephone reminder, the user may key in (using the touch pad) certain menu-driven commands in order to activate these features. For a pager, the user may press certain two-way buttons, and so on, for the different reminder media.

[0049] Another reply option may allow the user to purchase tickets for the event. This would obviously apply to events that require tickets, but may also be used for other events that require an advanced purchase such as pay-per-view television programs. Another reply option may allow the user to purchase other goods or services related to the event such as memorabilia, transportation services, etc. Another reply option may allow the user to indicate to the system that the system should activate a recording device to record a television/radio/online or other event at the user's request.

[0050] Other reply options may allow the user to cancel pending reminders, or to prevent future reminders from being sent to a particular address or device. For example, a user may block future unwanted telephone reminders by entering a particular telephone keypad code upon receiving an unwanted reminder call.

[0051] Another reply option may allow the user to respond with feedback about the event being scheduled. The system may use that feedback to compile "ratings" data or to notify the user if he/she requests to be reminded for an event that he/she has already attended/watched. Hence, a reminder might be sent either before or after an event.

[0052] In one embodiment, the system may require authorization before a particular media is used for delivering event messages. For example, in the case of telephone reminders, the system may require the user to adequately prove his/her identity before a telephone reminder could be sent. Methods of identification may include, without limi-

tation, having the user provide a digital ID, or a phone number that is linked through a public database to the individual's name, and/or replying to a communication initiated by the system.

[0053] Having thus described at least one illustrative embodiment of the present invention, various alterations, modifications, and improvements will readily occur to those skilled in the art. Such alterations, modifications, and improvements are intended to be within the spirit and scope of the invention. Accordingly, the foregoing description is by way of example only and is not intended as limiting.

What is claimed is:

1. A method of sending an event message for a scheduled event, the method comprising:

under control of a requesting system:

sending an event message request to a generating system, the request including a set of event criteria;

under control of the generating system:

receiving the event message request,

matching the event criteria with event data,

sending at least one event message to a recipient system, the event message containing event information for an event whose data matches the event criteria.

2. The method of claim 1, wherein the generating system stores the event message request for subsequent processing.

3. The method of claim 1, wherein the event message contains instructions to cause one or more of:

the operation of an audio-visual or recording device;

the sending of data to a calendar module; and

the completion of a transaction.

4. The method of claim 1, further comprising:

under control of the recipient system:

receiving the event message; and

updating a calendar module to incorporate the event message.

5. The method of claim 4, wherein the calendar module is updated without intervention by a user.

6. The method of claim 4, wherein the calendar module is updated subsequent to approval being granted by a user to perform the update to the calendar module.

7. The method of any one of claims 1-6, wherein the reminder and the event message are sent through the Internet.

8. The method of any one of claims 1-6, wherein the requesting system and generating system communicate with one another through a wireless connection.

9. The method of any one of claims 1-6, wherein the generating system and recipient system communicate with one another through a wireless connection.

10. The method as recited in claim 1, further comprising:

under control of the recipient system:

receiving the event message;

accessing a calendar module to determine if a conflict exists between the event message and a pre-existing event in the calendar module; and

when a conflict has been determined:

sending a second request to the generating system for a new event message for an alternate occurrence of the event.

11. The method of claim 1, further comprising:

under control of the recipient system:

sending a forwarding request to the generating system for a second event message to be sent to a different device capable of receiving reminders.

12. The method of claim 11, wherein the generating system stores the second event message request for subsequent processing.

13. The method of claim 11, wherein the second event message contains instructions to cause one or more of:

the operation of an audio-visual or recording device;

the sending of data to a calendar module; and

the completion of a transaction.

14. The method of claim 11, further comprising:

under control of the different device:

receiving the second event message; and

updating a calendar module to incorporate the event message.

15. The method as recited in claim 11, wherein the different device resides on a second recipient system.

16. The method as recited in claim 11, wherein the different device resides on the recipient system.

17. The method as recited in claim 11, wherein the different device resides on the generating system.

18. The method of claim 1, wherein the recipient system is the requesting system.

19. A computer readable medium storing executable instructions of a computer program to be executed by a computer system, the executable instructions comprising:

A) program code to be executed on a generating system to determine if the generating system receives a event message request including a set of event criteria from a requesting system;

B) program code to be executed on the generating system to send an event message from the generating system to a recipient system if the event criteria matches event data; and

C) program code to be executed on the recipient system to accept and handle the event message.

20. The computer readable medium of claim 19, the executable instructions further comprising:

D) program code to be executed on the recipient system to respond to the generating system after receiving the event message.

21. The computer readable medium of claim 19, wherein the program code to be executed on the recipient system includes instructions to cause one or more of:

the operation of an audio-visual or recording device;

the sending of data to a calander module; and

the completion of a transaction.

22. An apparatus for setting an appointment on a requesting system for a first scheduled event, the apparatus comprising:

a generating system including:

a processor responsive to an input device and a sequence of program instructions which sends an event message request to a generating system, the event message request including a set of event criteria;

a requesting system including:

a processor responsive to a sequence of program instructions which:

receives the event message request,

matches the event criteria with event data, and

sends an event message to the generating system, the event message containing event information for an event whose event data matches the event criteria.

23. A generating system for sending event messages to a requesting system, the generating system comprising:

a processor responsive to a sequence of program instructions which:

receives an event message request which includes event criteria,

matches the event criteria with event data,

sends an event message to a client system, the event message containing event information for an event whose event data matches the event criteria.

24. A requesting system for receiving event messages from a generating system, the requesting system comprising:

a processor responsive to an input device and a sequence of program instructions which:

receives an event schedule;

sends a event message request to a generating system, the event message request including a set of event criteria;

receives an event message from the generating system, the event message containing event information for an event whose event data matches the event criteria.

25. A method of setting an appointment reminder for a scheduled event on a requesting system, the method comprising:

by a generating system:

receiving event data;

receiving a query containing a set of event criteria from a user;

matching the event criteria to the event data; and

sending an event message to the user based on the results of the matching.

26. A method of setting an appointment reminder for a scheduled event on a requesting system, the method comprising:

by the requesting system:

sending a query containing a set of event criteria to a generating system;

sending calendar data to the generating system;

requesting an event message from the generating system; and

receiving the event message from the generating system.

27. A method of sending an event message for a scheduled event to a user, the method comprising:

by the user:

sending a event message request to a reminder processor, the event message request including a set of event criteria;

by the reminder processor:

receiving the event message request,

matching the event criteria with event data,

sending at least one event message to the user, the event message containing event information for an event whose data matches the event criteria.

28. The method of claim 27, further comprising:

by the reminder processor:

receiving updated event data,

matching the updated event data with the received event criteria,

sending at least one event message to the user containing updated event data wherein the data of at least one event matches the event criteria.

29. The method of claim 27, wherein the event message request contains instructions to cause one or more of:

the operation of an audio-visual or recording device;

the sending of data to a calander module; and

the completion of a transaction.

30. The method of claims 27 or 28, further comprising:

by the user:

receiving the event message; and

updating a calendar module to incorporate the event message.

31. The method of claim 30, wherein the calendar module is updated without intervention by the user.

32. The method of claim 31, wherein the calendar module is updated subsequent to the user granting approval to perform the updating of the calendar module.

33. The method of claims 27 or 28 further comprising:

by the user:

receiving the event message;

accessing a calendar module to determine if a conflict exists between the event message and a pre-existing event in the calendar module; and

when a conflict has been determined:

sending a second request to the reminder processor for a new event message for a next occurrence of the at least one event.

34. The method of claims 27, 28 or 29, further comprising:

by the user:

sending a forwarding request to the reminder processor for a second event message to be sent to a different device capable of receiving reminders.

35. The method of claim 34, wherein the reminder processor stores the second event message request for subsequent processing.

36. The method of claim 34, wherein the second event message contains instructions to cause one or more of:

the operation of an audio-visual or recording device;

the sending of data to a calendar module; and

the completion of a transaction.

37. The method of claim 34, further comprising:

under control of the different device:

receiving the second event message; and

updating a calendar module to incorporate the event message.

38. The method of claims 27, 28 or 29, wherein the event message contains event data unrelated to scheduling.

* * * * *

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Hayes-Roth (43) **Pub. Date: Jan. 17, 2002**

(54) **SYSTEM, METHOD, AND DEVICE FOR AUTHORING CONTENT FOR INTERACTIVE AGENTS**

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(21) Appl. No.: **09/738,275**

(22) Filed: **Dec. 14, 2000**

Related U.S. Application Data

(63) Non-provisional of provisional application No. 60/172,415, filed on Dec. 17, 1999.

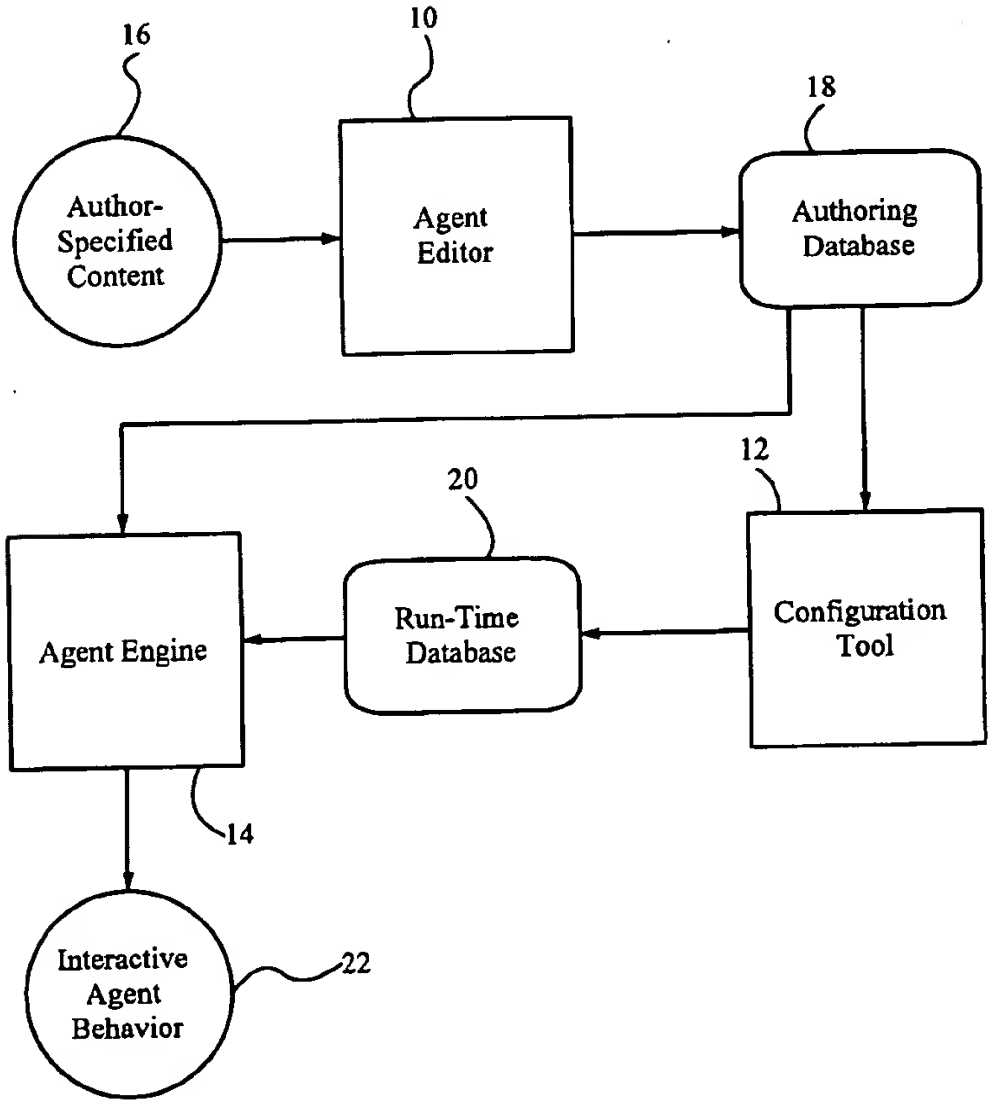
Publication Classification

(51) **Int. Cl.**[7] **G09G 5/00**

(52) **U.S. Cl.** **345/706**

(57) **ABSTRACT**

A method for authoring content of a computer-controlled agent includes the steps of identifying a potential context of the agent to an author; receiving content for the agent in the potential context from the author; and storing the content such that it can be accessed by a run-time agent. The run-time agent uses the content to control behavior of the agent in an actual context that matches the potential context. Context is typically presented to the author via a graphical user interface that allows the author to enter content without having any technical understanding of the run-time engine or the system's computer code. When the agent is authored using the authoring method, it can interact with a user through dialogue and gestures that are specific to contexts defined by user input, internal states or events of the agent, or input from other systems. For example, the agent responds to user questions differently when in different moods, and the agent's moods change in response to user statements or actions the agent performs.



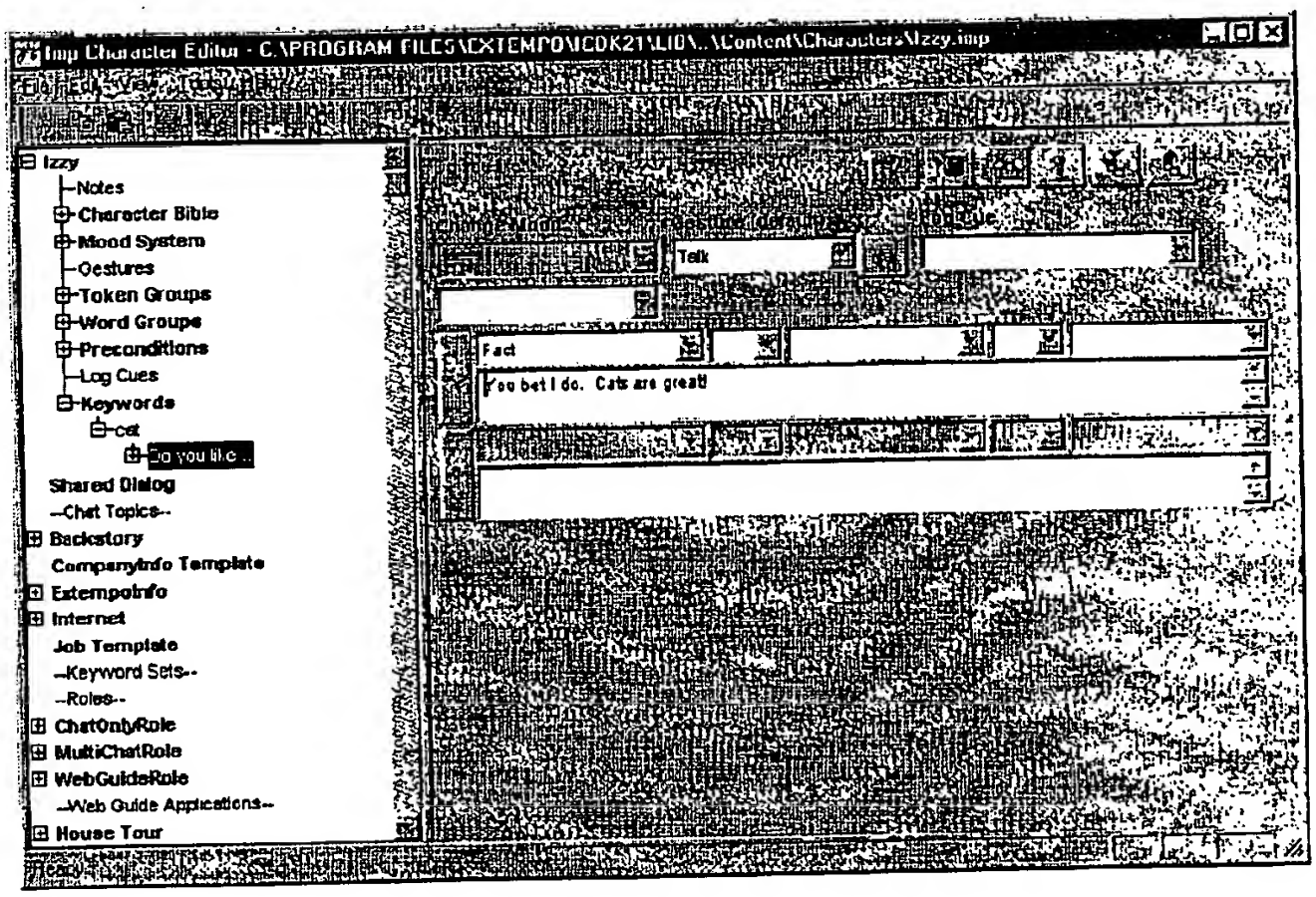
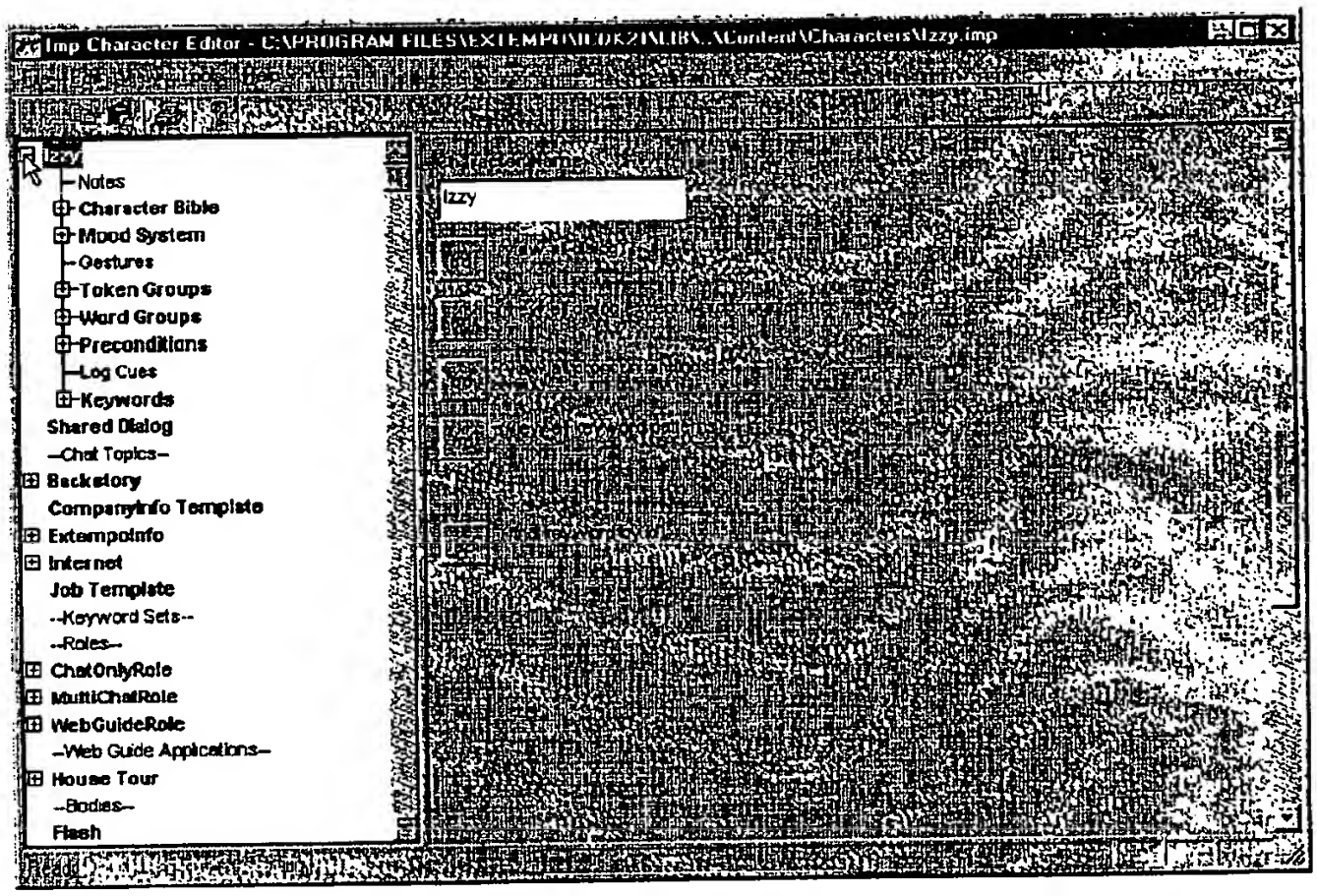

Izzy
Notes
Character Bible
Mood System
Gestures
Token Groups
Word Groups
Preconditions
Log Cues
Keywords
cat
Do you like ...
Shared Dialog
--Chat Topics--
Backstory
CompanyInfo Template
ExtempoInfo
Internet
Job Template
--Keyword Sets--
--Roles--
ChatOnlyRole
MultiChatRole
WebGuideRole
--Web Guide Applications--
House Tour
Talk
Fact
You bet I do. Cats are great!

FIG. 1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Gestures
Token Groups
Word Groups
Preconditions
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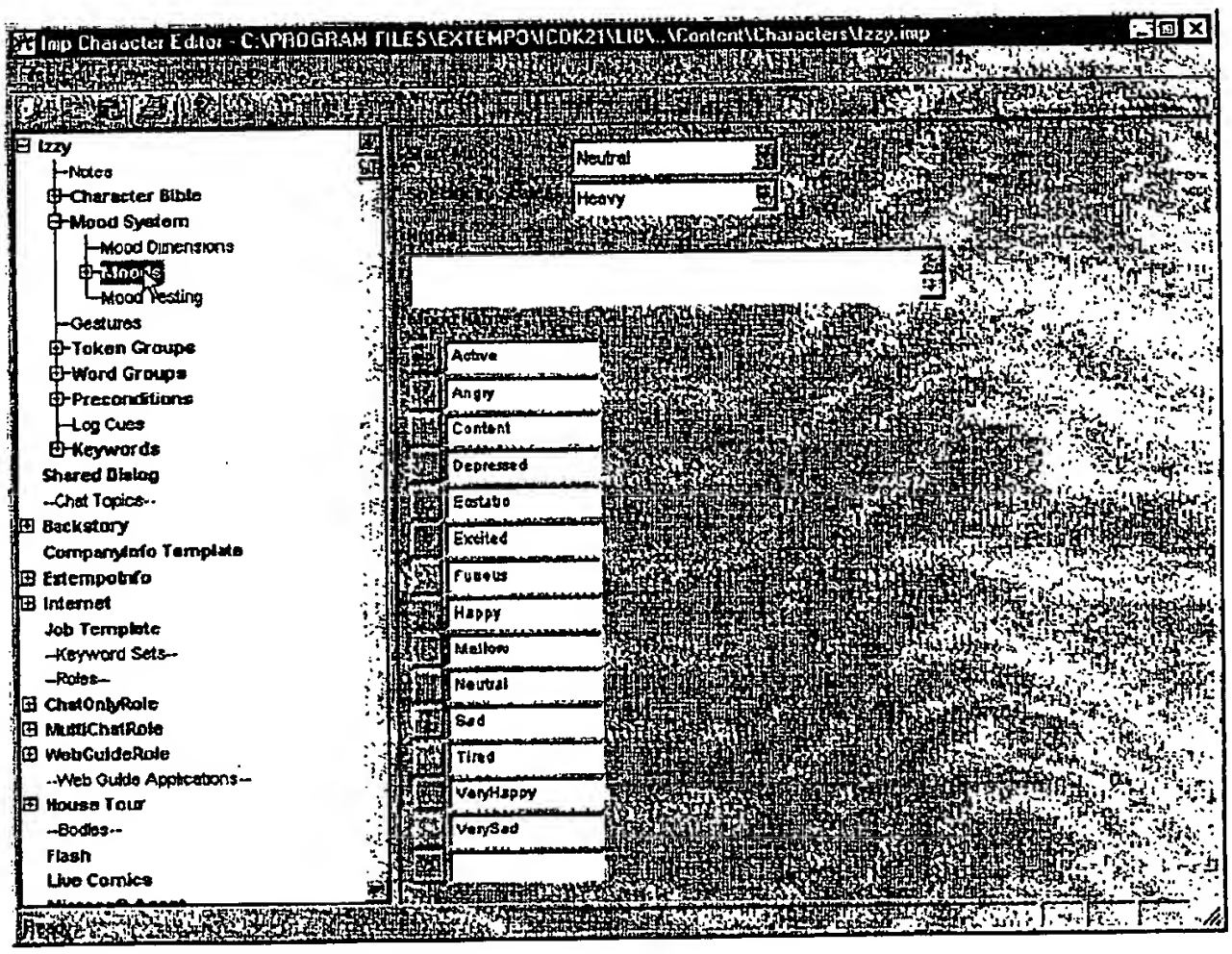
Keywords
Shared Dialog
--Chat Topics--
Backstory
CompanyInfo Template
ExtempoInfo
Internet
Job Template
--Keyword Sets--
--Roles--
ChatOnlyRole
MultiChatRole
WebGuideRole
--Web Guide Applications--
House Tour
--Bodies--
Flash
Izzy

FIG. 2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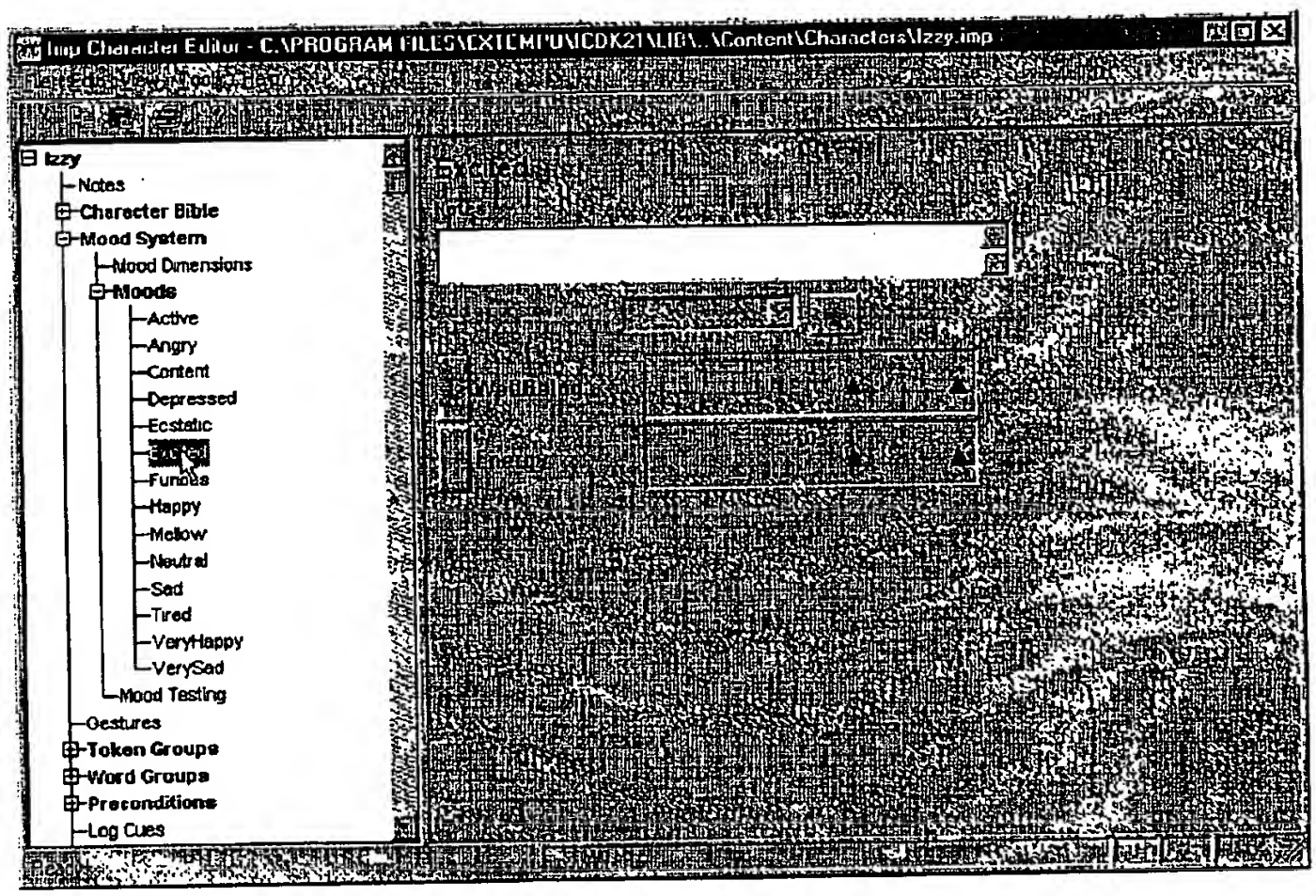
Mood System
Mood Dimensions
Moods
Mood Testing
Gestures
Token Groups
Word Groups
Preconditions
Log Cues
Keywords
Shared Dialog
--Chat Topics--
Backstory
CompanyInfo Template
ExtempoInfo
Internet
Job Template
--Keyword Sets--
--Roles--
ChatOnlyRole
MultiChatRole
WebGuideRole
--Web Guide Applications--
House Tour
--Bodies--
Flash
Live Comics
Neutral
Heavy
Active
Angry
Content
Depressed
Ecstatic
Excited
Furious
Happy
Mellow
Neutral
Sad
Tired
VeryHappy
VerySad

FIG. 3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Character Bible
Mood System
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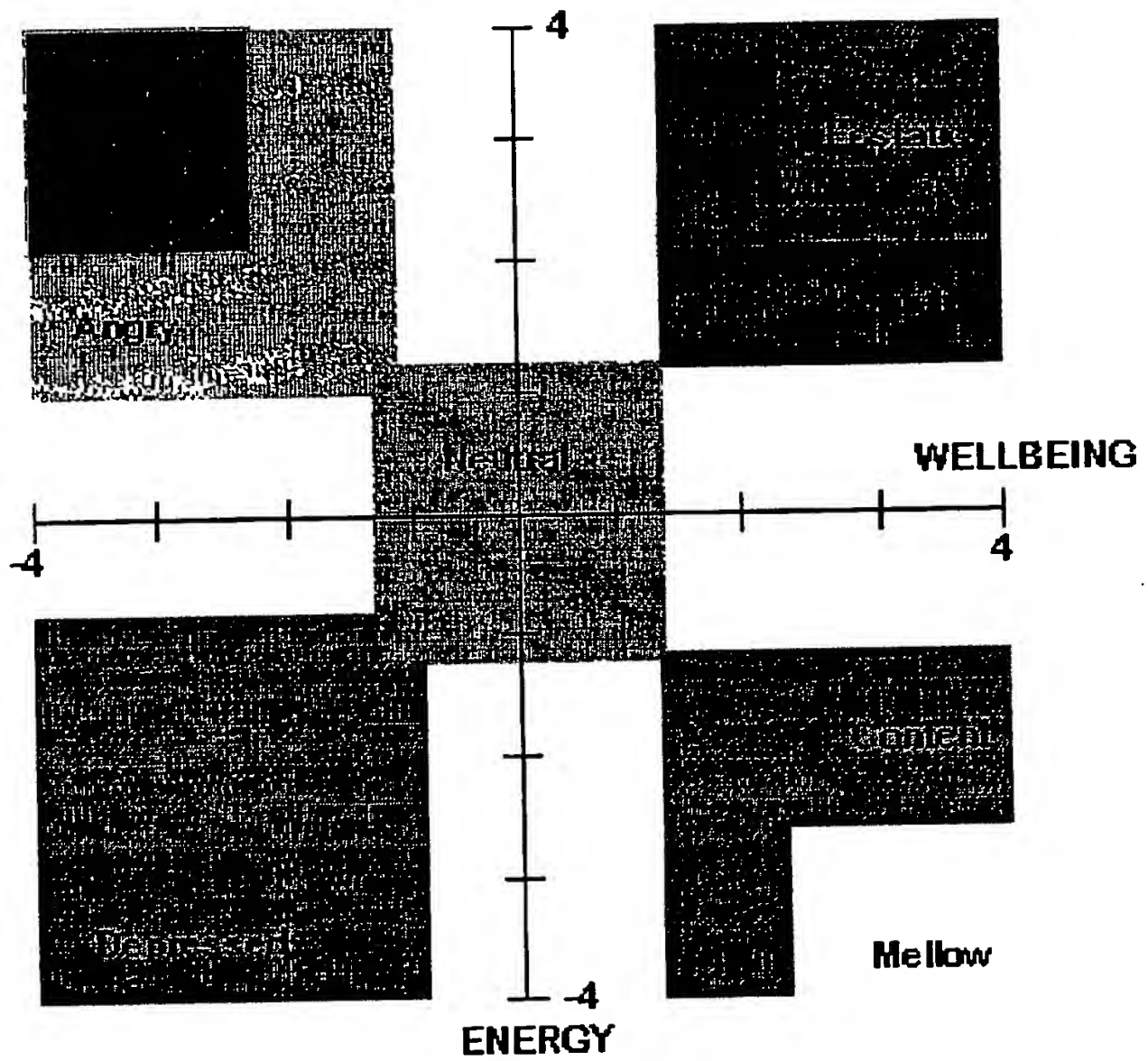
Angry
Content
Depressed
Ecstatic
Excited
Furious
Happy
Mellow
Neutral
Sad
Tired
VeryHappy
VerySad
Mood Testing
Gestures
Token Groups
Word Groups
Preconditions
Log Cues
Excited
Ready

FIG. 4



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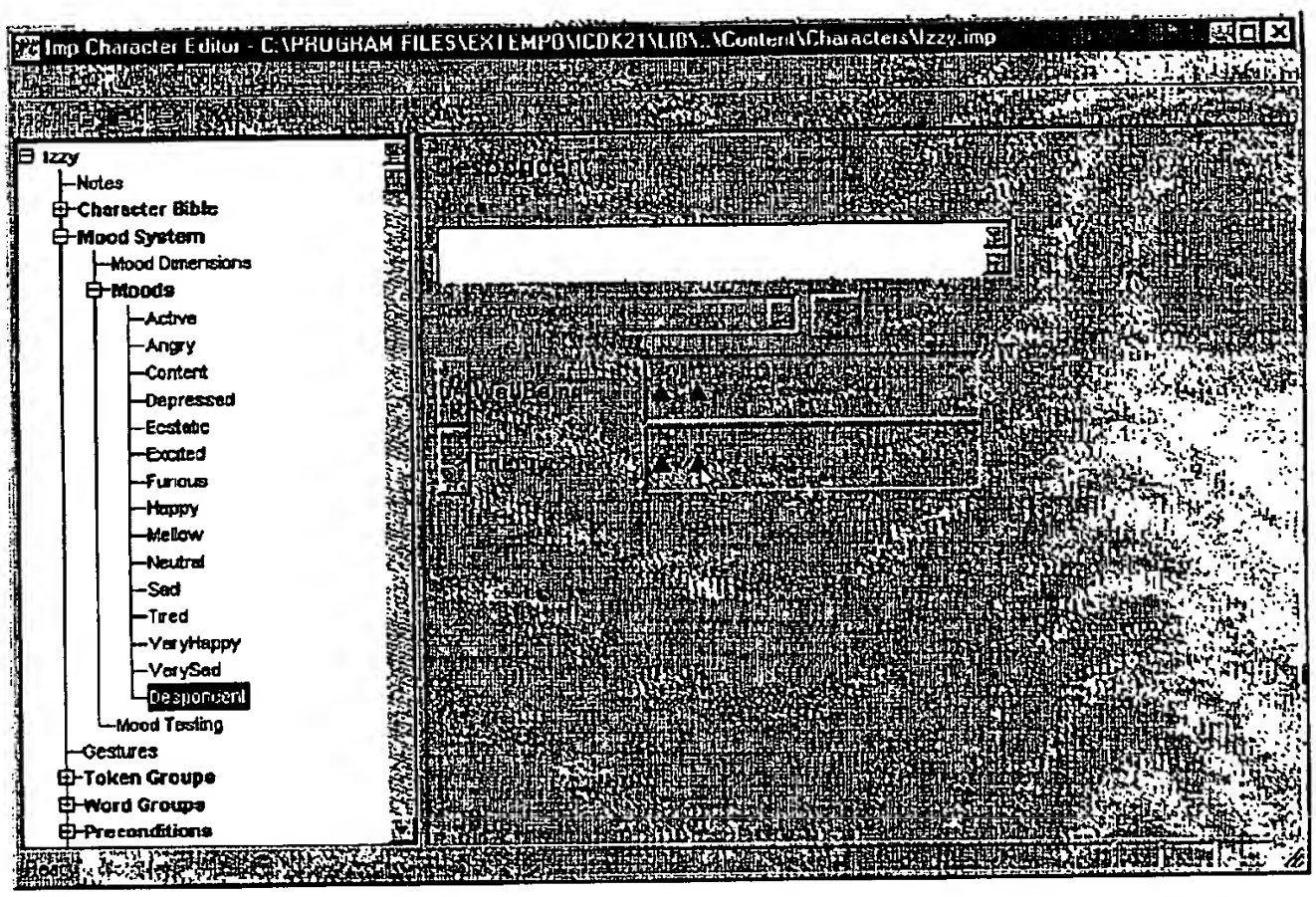
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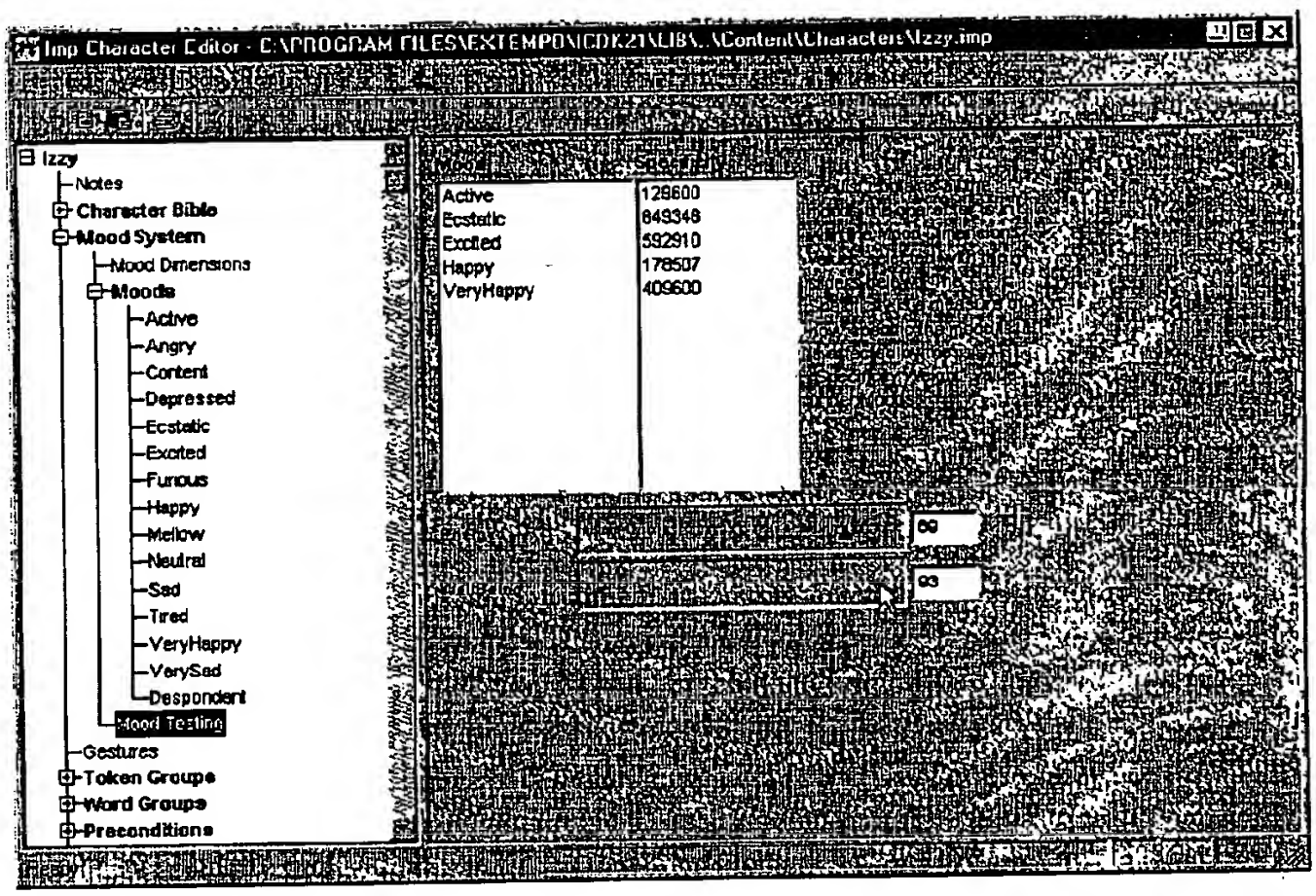
Character Bible
Mood System
Mood Dimensions
Moods
Active
Angry
Content
Depressed
Ecstatic
Excited
Furious
Happy
Mellow
Neutral
Sad
Tired
VeryHappy
VerySad
Despondent
Mood Testing
Gestures
Token Groups
Word Groups
Preconditions

FIG. 6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Mood System
Mood Dimensions
Moods
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Angry
Content
Depressed
Ecstatic
Excited
Furious
Happy
Mellow
Neutral
Sad
Tired
VeryHappy
VerySad
Despondent
Mood Testing
Gestures
Token Groups
Word Groups
Preconditions
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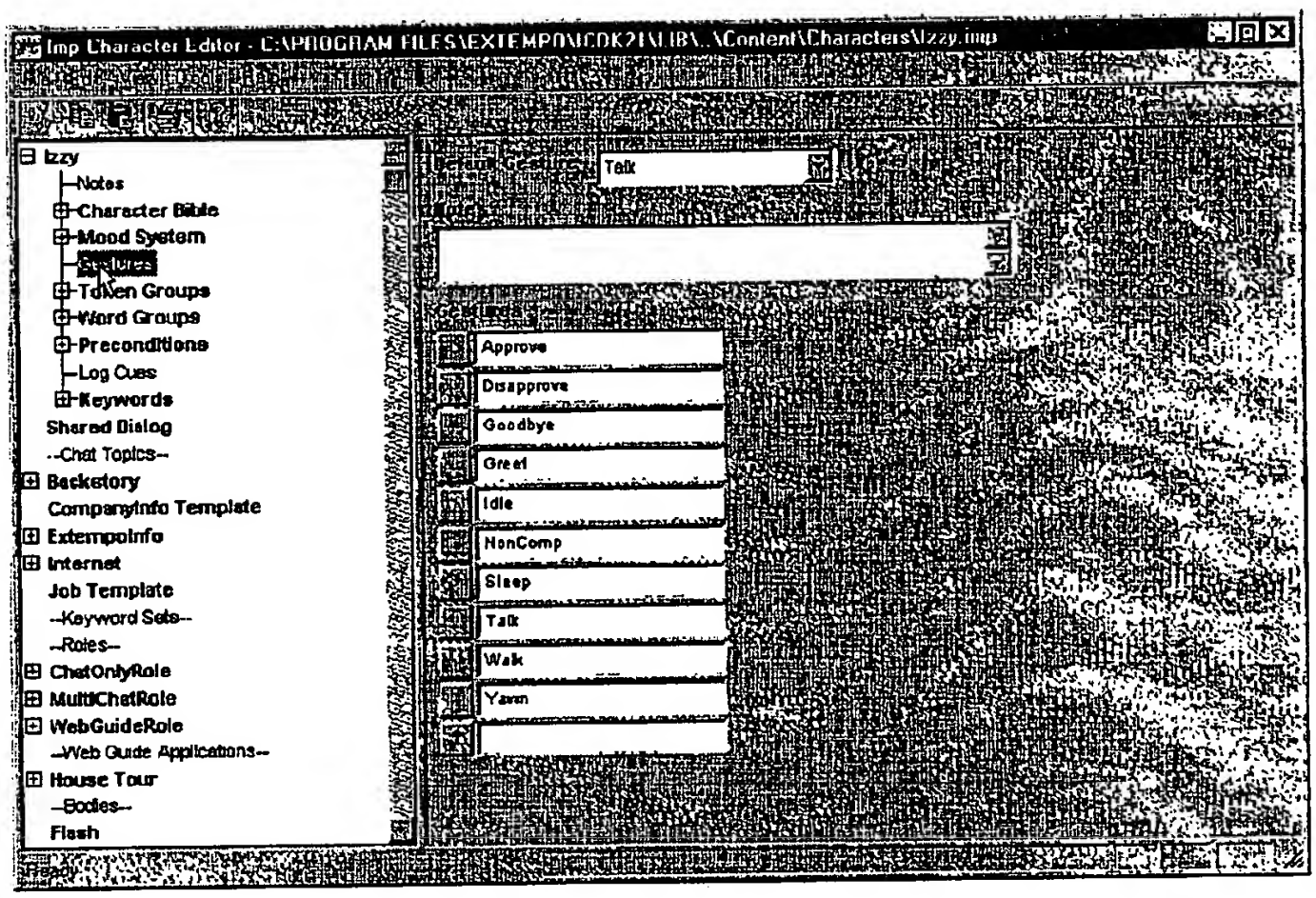
Ecstatic 849348
Excited 592910
Happy 178507
VeryHappy 409600
99
99

FIG. 7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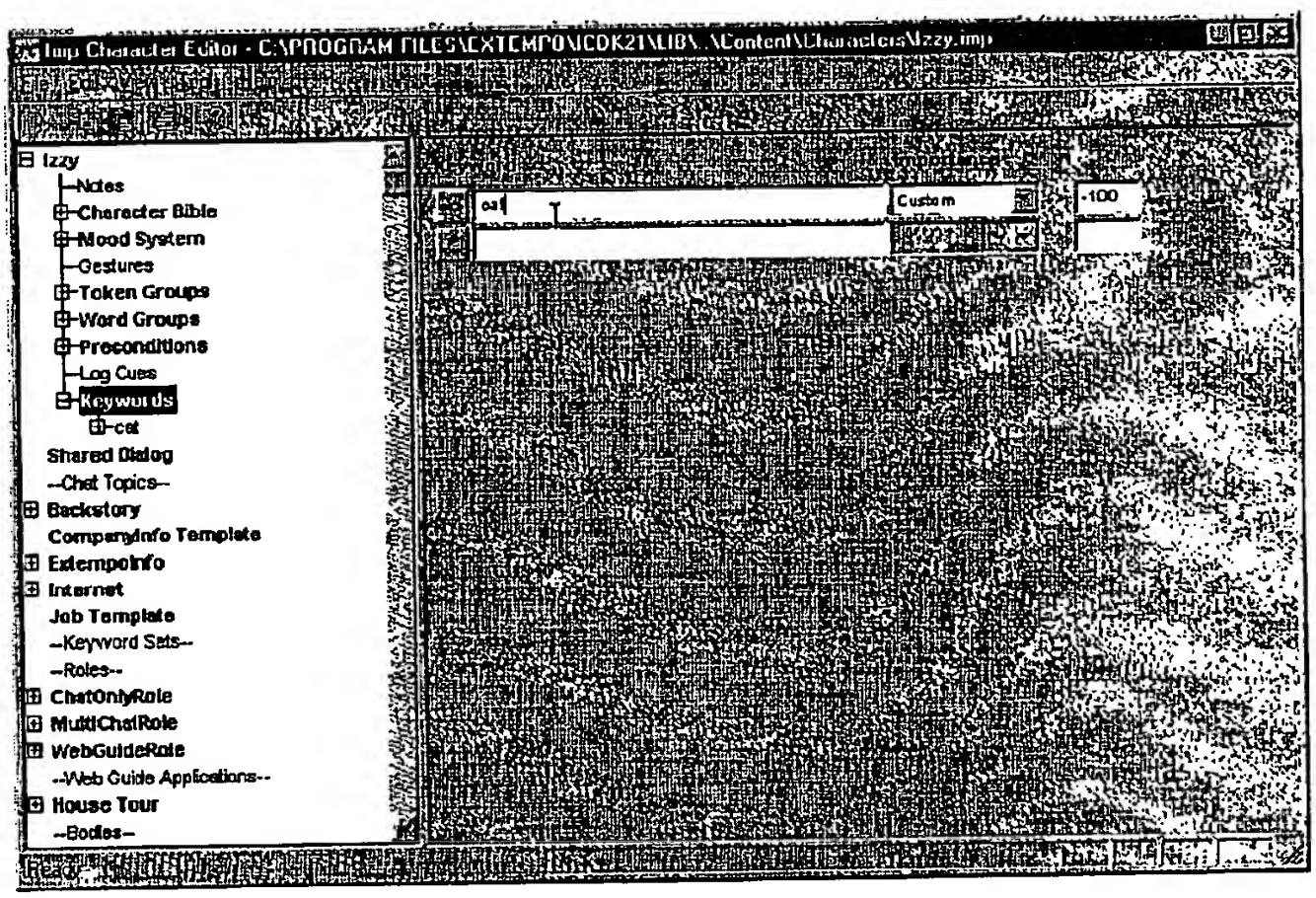
Character Bible
Mood System
Gestures
Token Groups
Word Groups
Preconditions
Log Cues
Keywords
Shared Dialog
--Chat Topics--
Backstory
CompanyInfo Template
ExtempoInfo
Internet
Job Template
--Keyword Sets--
--Roles--
ChatOnlyRole
MultiChatRole
WebGuideRole
--Web Guide Applications--
House Tour
--Bodies--
Flash
Default Gesture
Talk
Approve
Disapprove
Goodbye
Greet
Idle
NonComp
Sleep
Talk
Walk
Yawn
Ready

FIG. 8


Izzy
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Character Bible
Mood System
Gestures
Token Groups
Word Groups
Preconditions
Log Cues
Keywords
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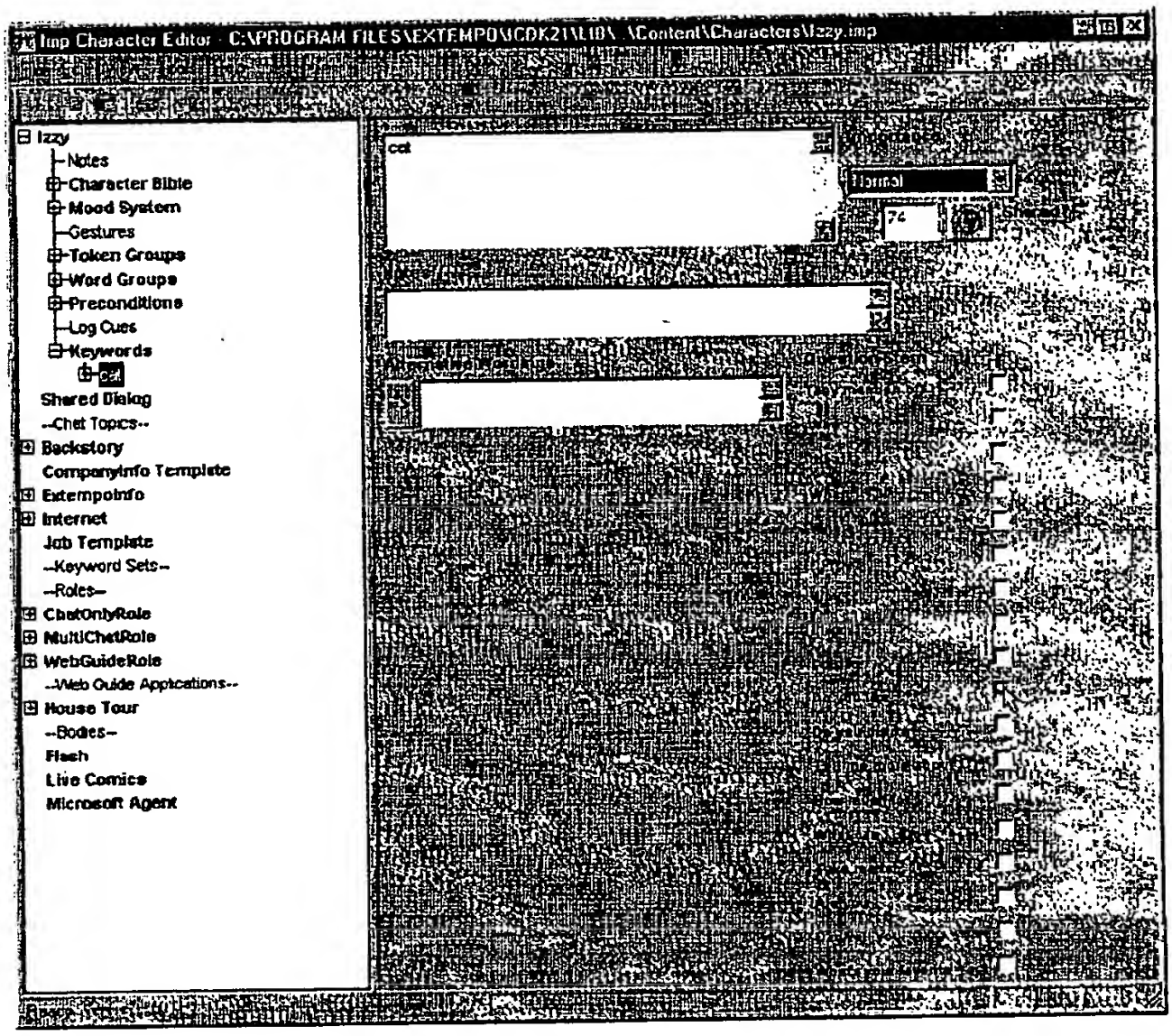
Shared Dialog
--Chat Topics--
Backstory
CompanyInfo Template
ExtempoInfo
Internet
Job Template
--Keyword Sets--
--Roles--
ChatOnlyRole
MultiChatRole
WebGuideRole
--Web Guide Applications--
House Tour
--Bodies--
cat
Custom
-100

FIG. 9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Gestures
Token Groups
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Preconditions
Log Cues
Keywords
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--Chat Topics--
Backstory
CompanyInfo Template
ExtempoInfo
Internet
Job Template
--Keyword Sets--
--Roles--
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MultiChatRole
WebGuideRole
--Web Guide Applications--
House Tour
--Bodies--
Flash
Live Comics
Microsoft Agent
cat
Normal
74

FIG. 10

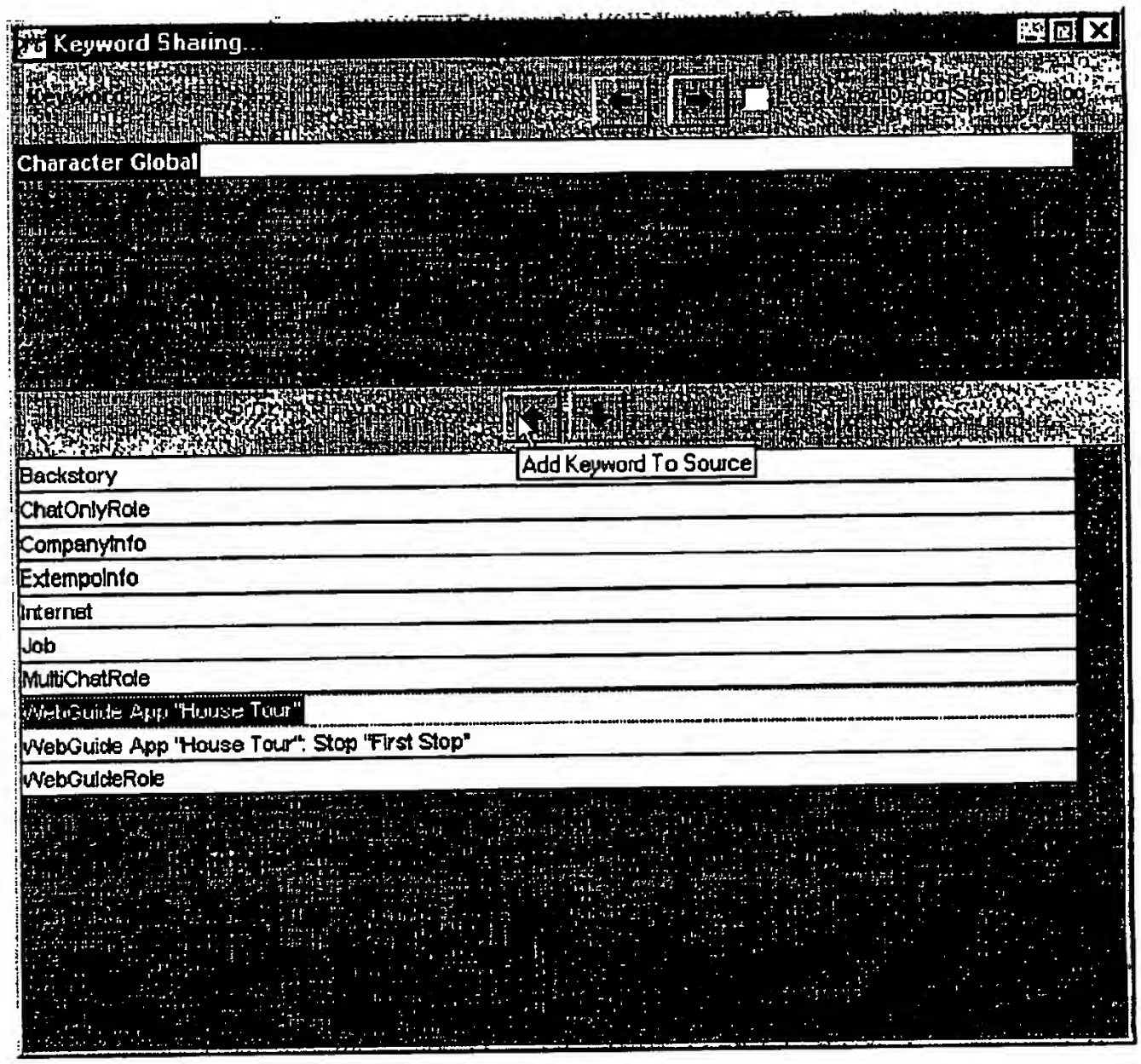
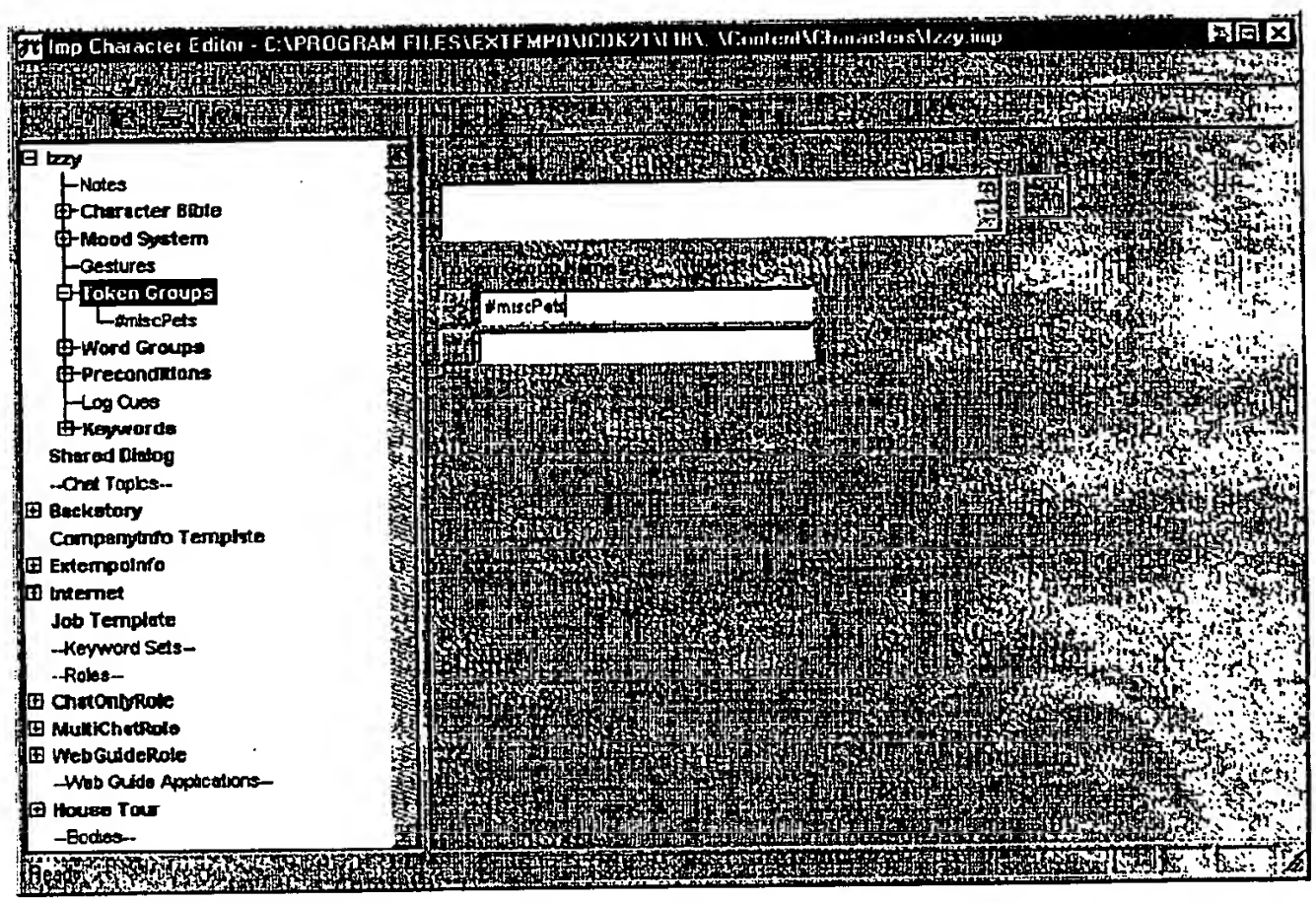

Keyword Sharing...
Character Global
Add Keyword To Source
Backstory
ChatOnlyRole
CompanyInfo
ExtempoInfo
Internet
Job
MultiChatRole
WebGuide App "House Tour"
WebGuide App "House Tour": Stop "First Stop"
WebGuideRole

FIG. 11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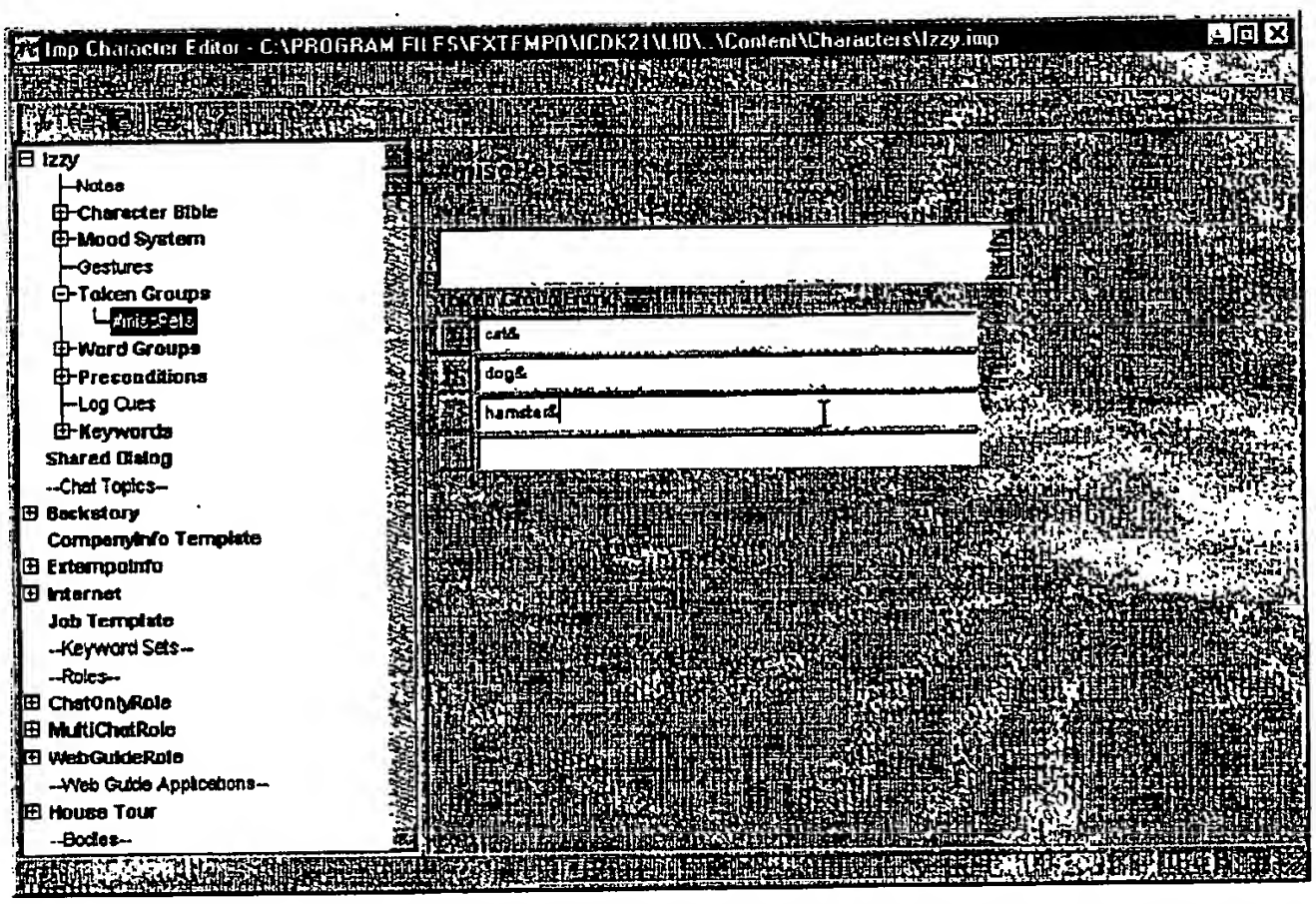
Mood System
Gestures
Token Groups
#miscPets
Word Groups
Preconditions
Log Cues
Keywords
Shared Dialog
--Chat Topics--
Backstory
CompanyInfo Template
ExtempoInfo
Internet
Job Template
--Keyword Sets--
--Roles--
ChatOnlyRole
MultiChatRole
WebGuideRole
--Web Guide Applications--
House Tour
--Bodies--
#miscPets
Ready

FIG. 12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Character Bible
Mood System
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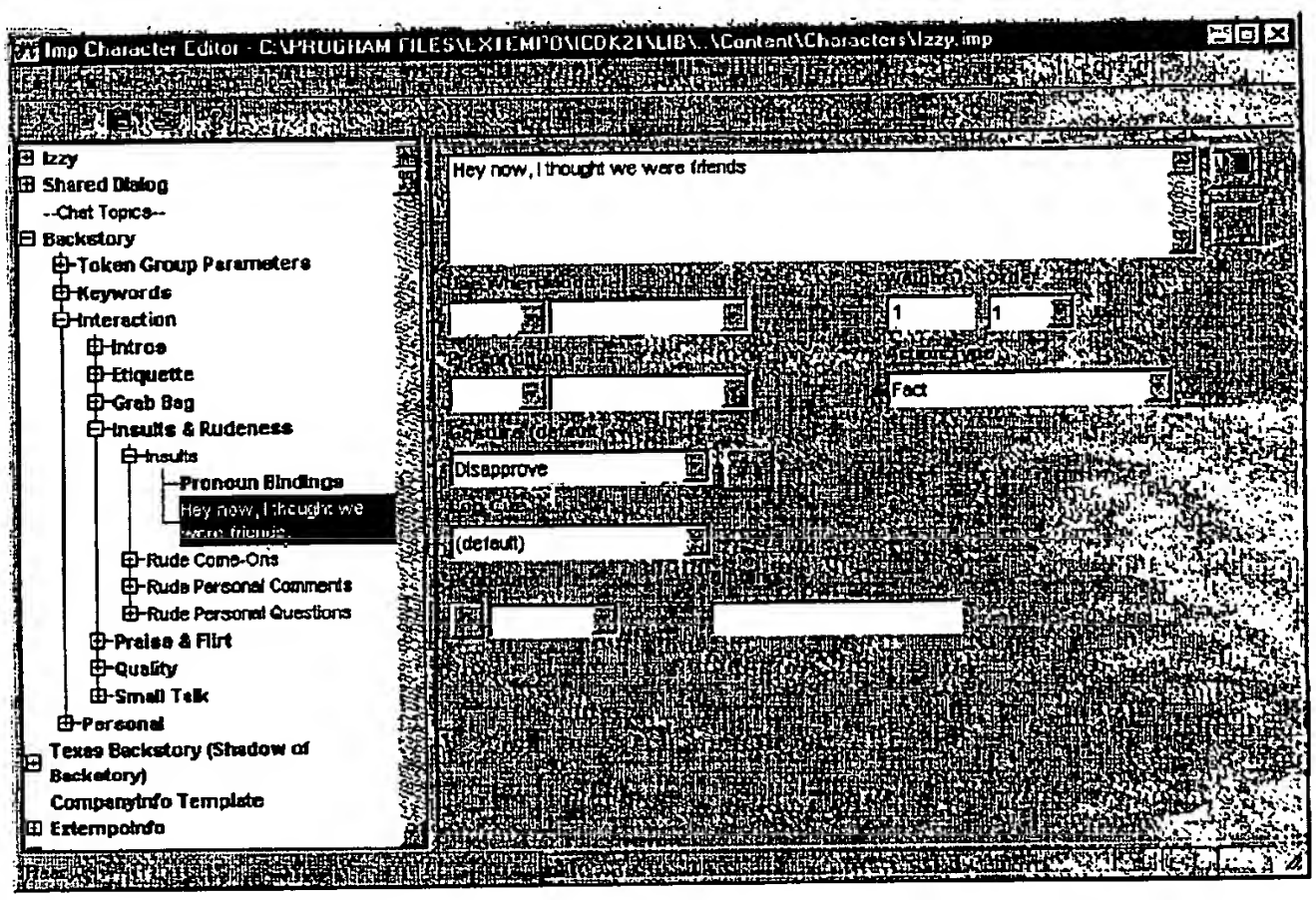
AnimalSets
Word Groups
Preconditions
Log Cues
Keywords
Shared Dialog
--Chat Topics--
Backstory
CompanyInfo Template
Extempolnfo
Internet
Job Template
--Keyword Sets--
--Roles--
ChatOnlyRole
MultiChatRole
WebGuideRole
--Web Guide Applications--
House Tour
--Bodies--
cat&
dog&
hamster&

FIG. 13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Izzy
Shared Dialog
--Chat Topics--
Backstory
Token Group Parameters
Keywords
Interaction
Intros
Etiquette
Grab Bag
Insults & Rudeness
Insults
Pronoun Bindings
Hey now, I thought we were friends
Rude Come-Ons
Rude Personal Comments
Rude Personal Questions
Praise & Flirt
Quality
Small Talk
Personal
Texas Backstory (Shadow of Backstory)
CompanyInfo Template
Extempoinfo
Hey now, I thought we were friends
1
1
Fact
Disapprove
(default)

FIG. 14

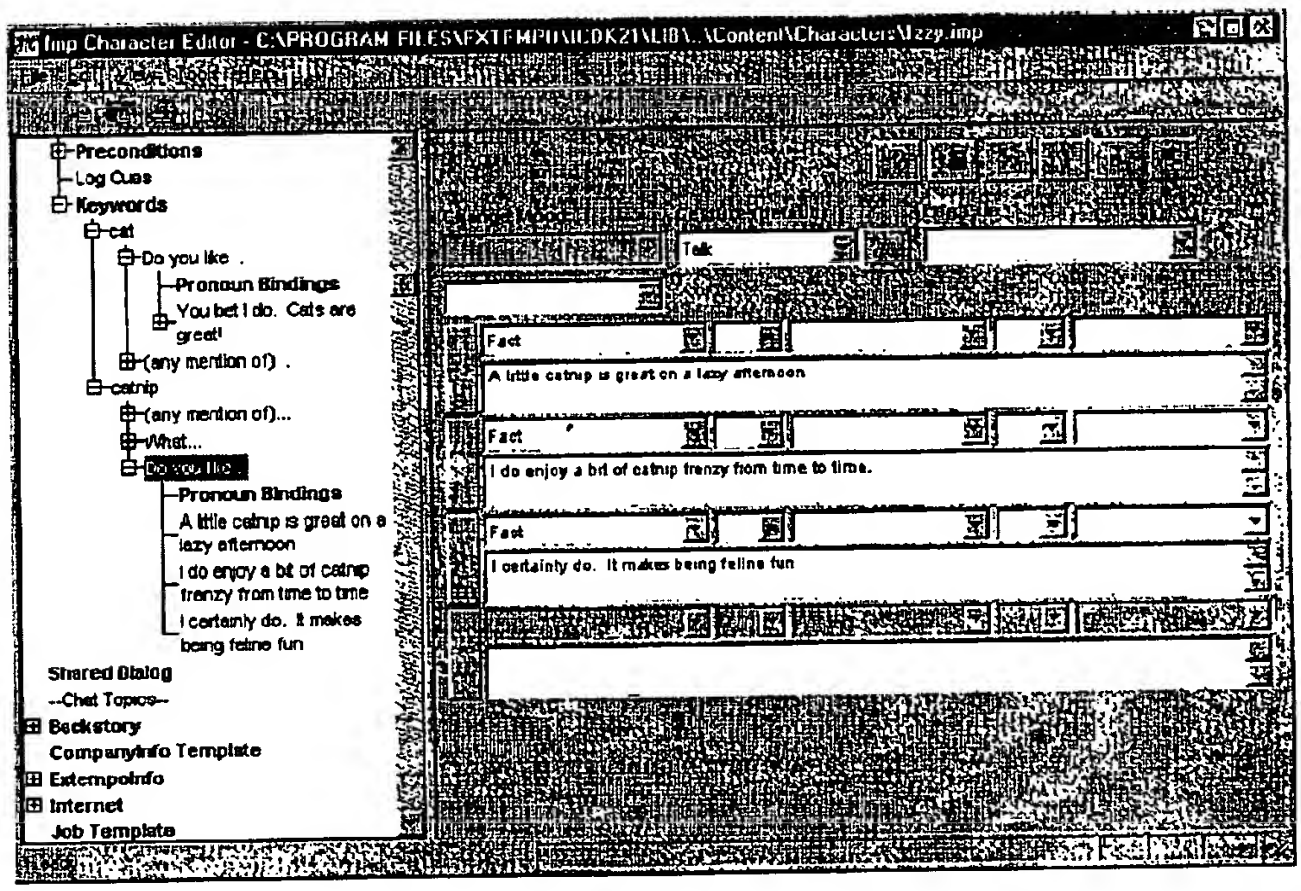

Preconditions
Log Cues
Keywords
cat
Do you like .
Pronoun Bindings
You bet I do. Cats are great!
(any mention of) .
catnip
(any mention of)...
What...
Pronoun Bindings
A little catnip is great on a lazy afternoon
I do enjoy a bit of catnip frenzy from time to time
I certainly do. It makes being feline fun
Shared Dialog
--Chat Topics--
Backstory
CompanyInfo Template
ExtempoInfo
Internet
Job Template
Talk
Fact
A little catnip is great on a lazy afternoon
Fact
I do enjoy a bit of catnip frenzy from time to time.
Fact
I certainly do. It makes being feline fun

FIG. 15

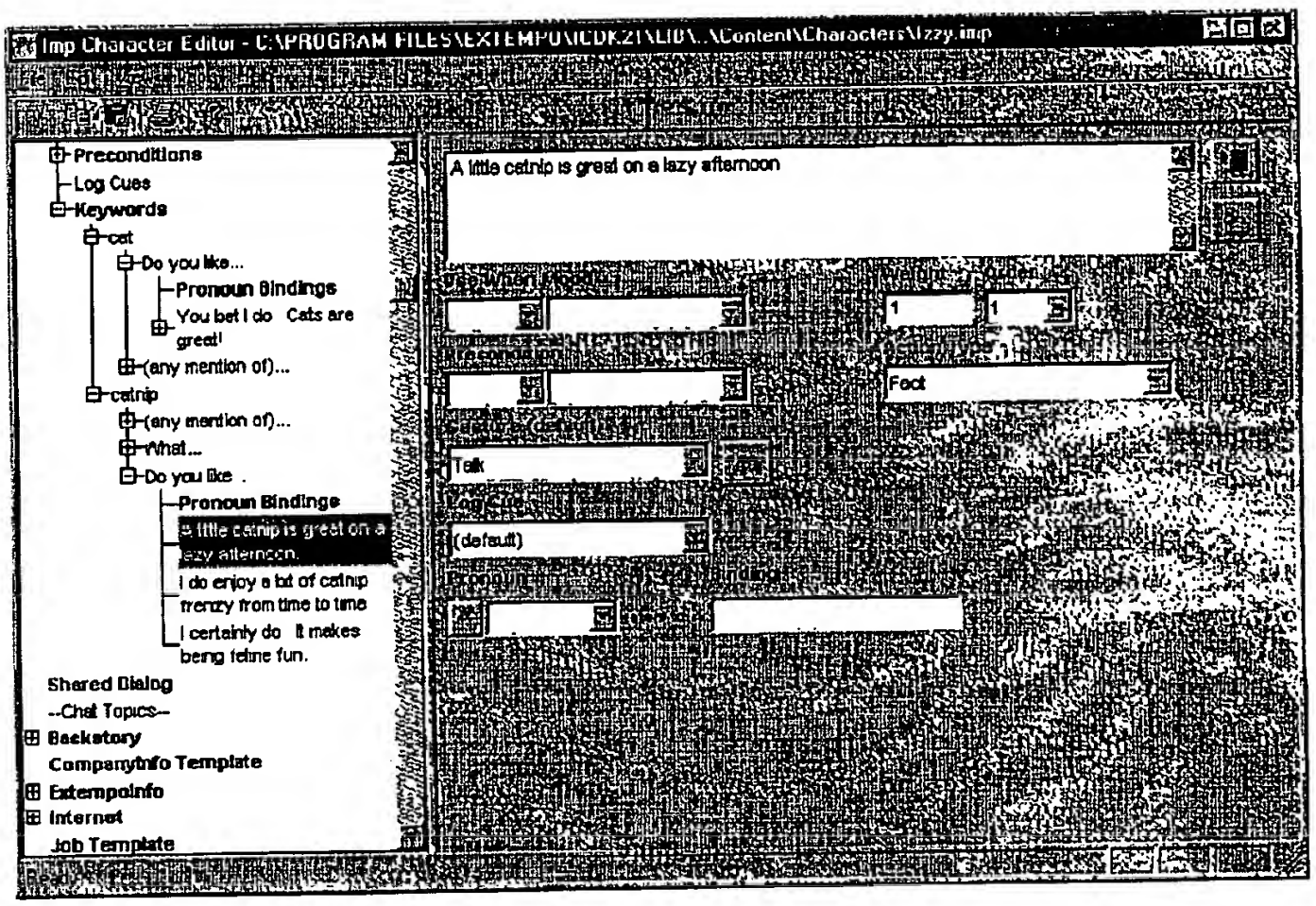

Imp Character Editor - C:\PROGRAM FILES\EXTEMPO\ICDK2\LIB\..\Content\Characters\Izzy.imp
Preconditions
Log Cues
Keywords
cat
Do you like...
Pronoun Bindings
You bet I do Cats are great!
(any mention of)...
catnip
(any mention of)...
What...
Do you like .
Pronoun Bindings
a little catnip is great on a lazy afternoon.
I do enjoy a bit of catnip frenzy from time to time
I certainly do It makes being feline fun.
Shared Dialog
--Chat Topics--
Backstory
CompanyInfo Template
ExtempoInfo
Internet
Job Template
A little catnip is great on a lazy afternoon
Fact
Talk
(default)

FIG. 16

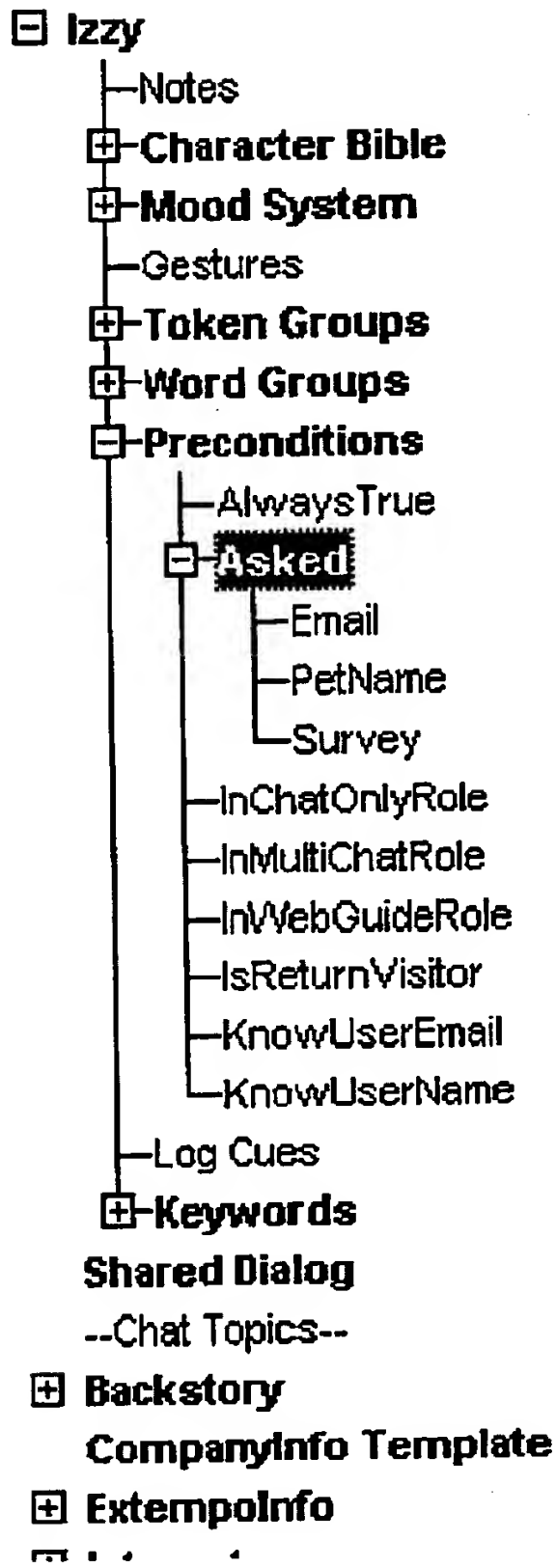
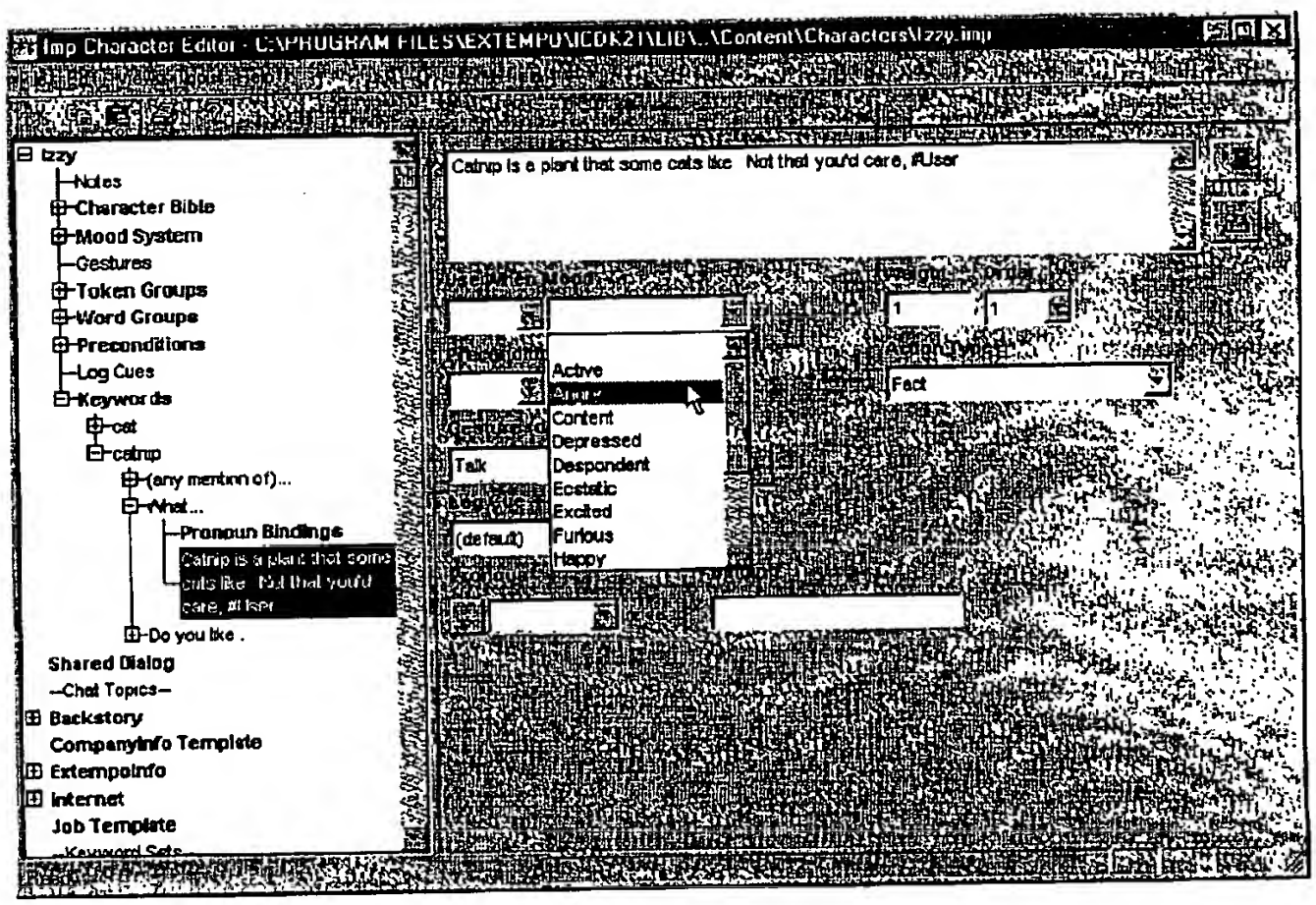

Izzy
Notes
Character Bible
Mood System
Gestures
Token Groups
Word Groups
Preconditions
AlwaysTrue
Asked
Email
PetName
Survey
InChatOnlyRole
InMultiChatRole
InWebGuideRole
IsReturnVisitor
KnowUserEmail
KnowUserName
Log Cues
Keywords
Shared Dialog
--Chat Topics--
Backstory
CompanyInfo Template
ExtempoInfo

FIG. 17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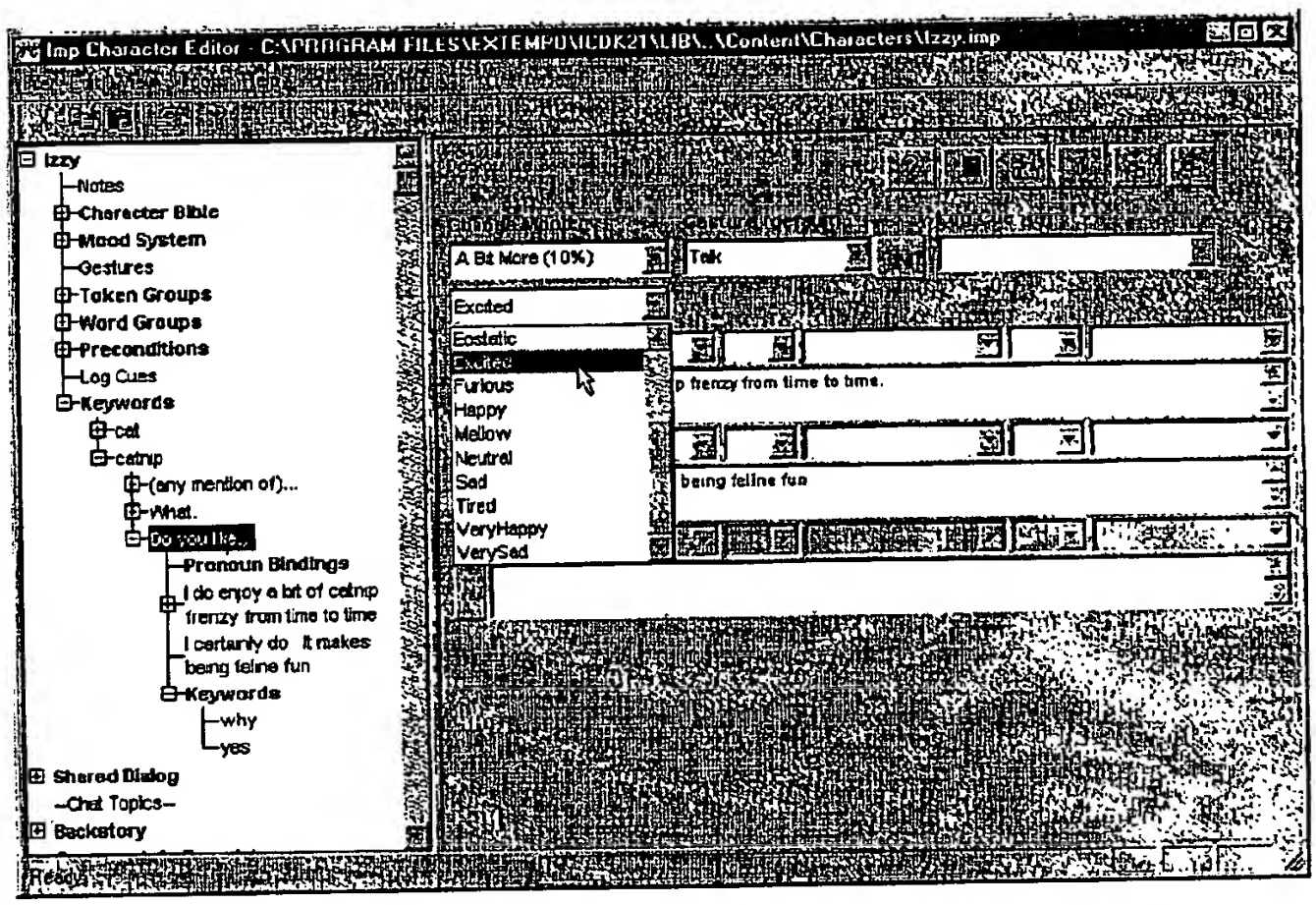
Izzy
Notes
Character Bible
Mood System
Gestures
Token Groups
Word Groups
Preconditions
Log Cues
Keywords
cat
catnip
(any mention of)...
What...
Pronoun Bindings
Catnip is a plant that some cats like Not that you'd care, #User
Do you like .
Shared Dialog
--Chat Topics--
Backstory
CompanyInfo Template
ExtempoInfo
Internet
Job Template
Catnip is a plant that some cats like Not that you'd care, #User
Active
Angry
Content
Depressed
Despondent
Ecstatic
Excited
Furious
Happy
Talk
(default)
Fact
1
1

FIG. 18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Izzy
Notes
Character Bible
Mood System
Gestures
Token Groups
Word Groups
Preconditions
Log Cues
Keywords
cat
catnip
(any mention of)...
What.
Do you like...
Pronoun Bindings
I do enjoy a bit of catnip frenzy from time to time
I certainly do. It makes being feline fun
Keywords
why
yes
Shared Dialog
--Chat Topics--
Backstory
A Bit More (10%)
Talk
Excited
Ecstatic
Excited
Furious
Happy
Mellow
Neutral
Sad
Tired
VeryHappy
VerySad
p frenzy from time to time.
being feline fun
Ready

FIG. 19

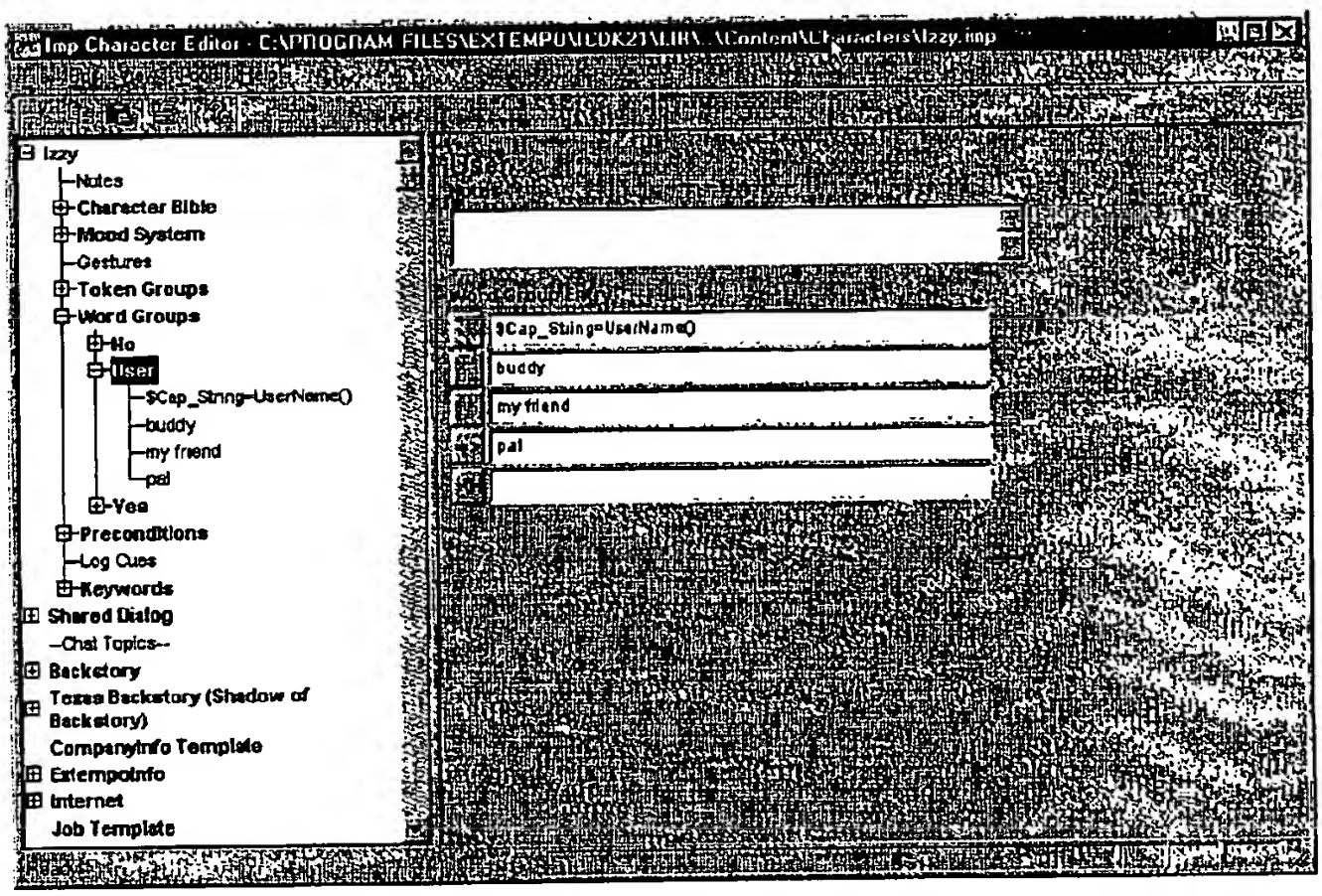
Imp Character Editor - C:\PROGRAM FILES\EXTEMPO\CDK21\LIB\...\Content\Characters\Izzy.imp
Izzy
Notes
Character Bible
Mood System
Gestures
Token Groups
Word Groups
No
User
$Cap_String=UserName()
buddy
my friend
pal
Yes
Preconditions
Log Cues
Keywords
Shared Dialog
--Chat Topics--
Backstory
Tessa Backstory (Shadow of Backstory)
CompanyInfo Template
ExtempoInfo
Internet
Job Template
$Cap_String=UserName()
buddy
my friend
pal

FIG. 20

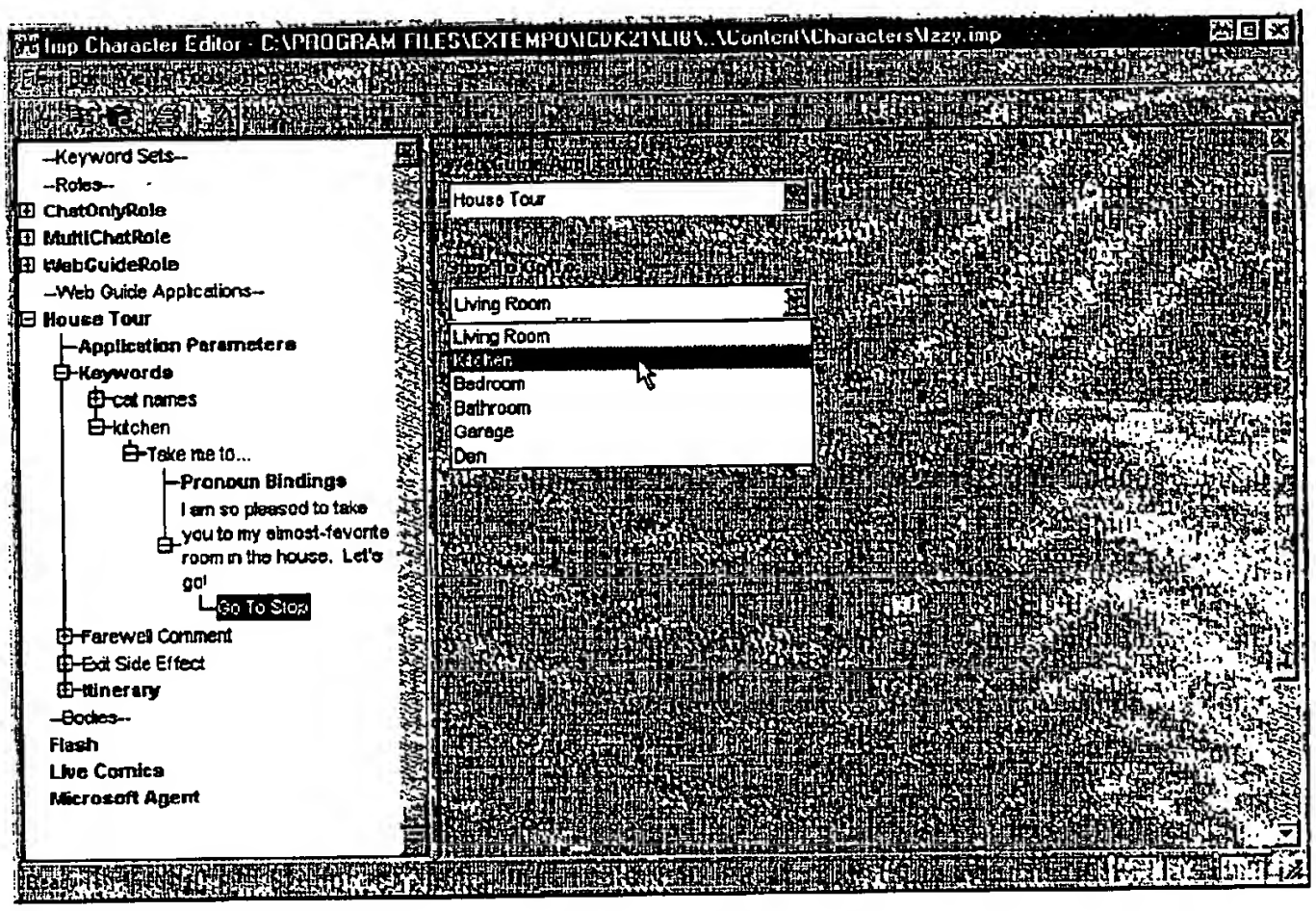
Imp Character Editor - C:\PROGRAM FILES\EXTEMPO\ICDK21\LIB\...\Content\Characters\Izzy.imp
--Keyword Sets--
--Roles--
ChatOnlyRole
MultiChatRole
WebGuideRole
--Web Guide Applications--
House Tour
Application Parameters
Keywords
cat names
kitchen
Take me to...
Pronoun Bindings
I am so pleased to take you to my almost-favorite room in the house. Let's go!
Go To Story
Farewell Comment
Exit Side Effect
Itinerary
--Bodies--
Flash
Live Comics
Microsoft Agent
House Tour
Living Room
Living Room
Kitchen
Bedroom
Bathroom
Garage
Den

FIG. 21

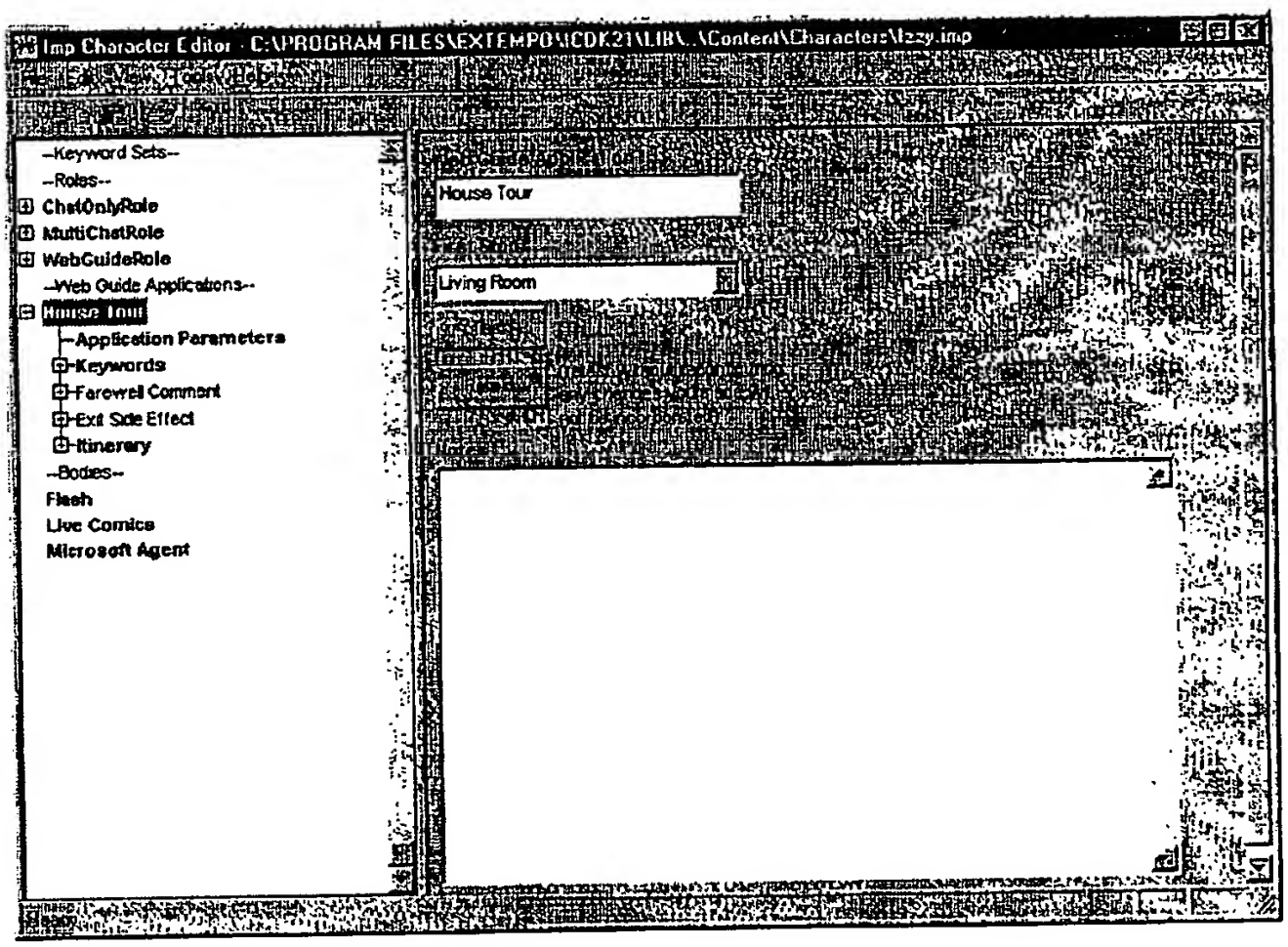
Imp Character Editor - C:\PROGRAM FILES\EXTEMPO\CDK21\LIB\..\Content\Characters\Izzy.imp
--Keyword Sets--
--Roles--
ChatOnlyRole
MultiChatRole
WebGuideRole
--Web Guide Applications--
House Tour
Application Parameters
Keywords
Farewell Comment
Exit Side Effect
Itinerary
--Bodies--
Flash
Live Comics
Microsoft Agent
House Tour
Living Room

FIG. 22

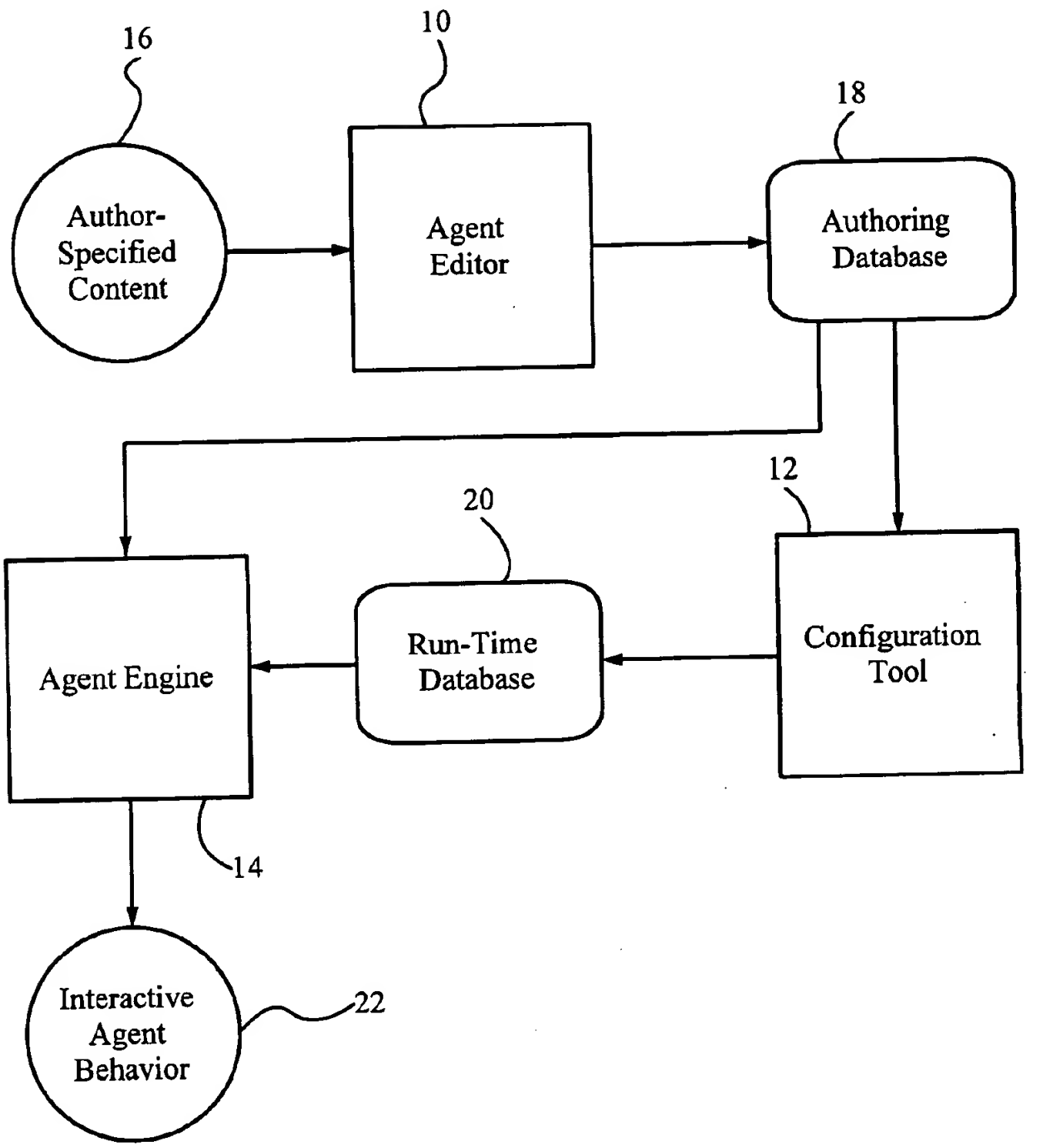
16
10
18
Author-Specified Content
Agent Editor
Authoring Database
12
20
Agent Engine
Run-Time Database
Configuration Tool
14
Interactive Agent Behavior
22

FIG. 23

SYSTEM, METHOD, AND DEVICE FOR AUTHORING CONTENT FOR INTERACTIVE AGENTS

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Provisional Application No. 60/172,415, filed Dec. 17, 1999, which is herein incorporated by reference.

FIELD OF THE INVENTION

[0002] This invention relates generally to systems, methods and devices for developing computer and other media systems that interact with people, with one another, and with other computer controlled systems. More particularly, it relates to systems, methods, and devices for developing computer agents and characters that can interact with people, with other computer agents and characters, and with other computational or media entities.

BACKGROUND ART

[0003] Recent developments in software technology support the creation of interactive agents that can interact with people, with one another, and with other computer-controlled systems. Some of these agents can interact in natural language, sometimes including speech input or output. Some agents may be "embodied" in animation and include animated gestures or expressions in their interactions. Some agents may perform their functions on web sites, in stand-alone applications, or in email. They may interact via desk-top or lap-top computers, telephones, hand-held wireless devices, or other communications media. Some agents may have personas, including a biography, personal data, emotional or other psychological qualities, etc. Some agents may perform particular jobs, such as customer service, sales assistance, learner assistance, survey administration, interactive messaging, game play partnering, entertainment, etc. They may interact with other computational entities, such as databases, e-commerce systems, web browsers, etc. It will be apparent to one familiar with these developments that interactive agents may exhibit a great variety of specific combinations of features and functions, not unlike the great variety of specific features exhibited by human beings.

[0004] It is possible to distinguish two component tasks in the development of interactive agents: software development and content development.

[0005] Software development creates the computer code that provides the basic computational functionality that will be available in principle to every agent run with that particular software Software development is usually performed by highly trained technical experts who produce code written in C++, Java, or another software language.

[0006] Content development creates the data that must be combined with the code in order to complete a particular agent. Content development may be performed by people with various talents and skills, depending upon the application and the content development tools available. In many cases, non-technical experts are best equipped to create the dialogue, social skills, interactive expertise, personality, gestures, etc. of a given interactive agent. However, with existing systems, content development must include specification, either explicit or implicit, of a substantial amount of the detailed logic that is characteristic of computer programming. As a result, non-technical experts must either acquire technical skills or depend upon significant support from technical experts, in order to convert the content they design into data that can be used by the agent software. Similar technical expertise is required to make changes to agent content following initial development. This approach to content development is expensive, inefficient, and ineffective.

[0007] What is needed is a method for content development for interactive agents that enables non-technical professionals to work directly and independently of technical experts in order to create the dialogue, social skills, interactive expertise, personality, gestures, etc. of interactive agents.

SUMMARY

[0008] The present invention provides such a method by anticipating the abstract structure of prospective interactions between agents and their users, defining localized contexts within that abstract structure, and allowing authors to create content for each such localized context. These contexts may be defined in a variety of ways to map on to the conceptual structures non-technical experts bring to the job of content development, for example:

[0009] Creating responses to standard social questions a user might pose to the agent (e.g., How are you? Where do you live? Do you like movies?),

[0010] Setting up an agenda of goals the agent might have for a particular stage in the interaction (e.g., Chat about own pets; Ask the user if she or he has pets; If so, ask for their names and animal-types; Offer to send a pet-food coupon; If user accepts, request email address),

[0011] Specifying alternative dialogue and gestures for different agent moods (e.g., saying goodbye to the user while feeling happy versus sad).

[0012] Specifically, the present invention provides a method for authoring content of a computer-controlled agent, with the following steps: identifying to an author a potential context of the agent; receiving from the author content for the agent in the potential context; and storing the content such that it can be accessed by a run-time system that uses the content to control the behavior of the agent in an actual context that occurs during operation of the agent and that matches the potential context. The authored content can be a persona, application, or role of the agent, or may relate to natural language conversation in which the agent engages. Specific instances of content can refer to dialogue delivered by the agent, gestures, mood changes, precondition values, interactions of the agent with external systems, and an agent's itinerary or agenda.

[0013] Potential contexts include user inputs during operation of the agent, an internal event or state of the agent, or an input from a different computer-controlled process. All of the potential contexts can refer to an agent-mood of the agent, an assumed user-mood of the user, messages between the agent and user, other computer applications, actions performed by the agent, an itinerary of the agent, or chat topics known by the agent. Potential contexts can be iden-

tified by the user or for the user, preferably in a graphical user interface that contains menus, labeled slots, gesture tables, symbolic indicators, and icons representing functions.

BRIEF DESCRIPTION OF THE FIGURES

[0014] **FIG. 1** shows a particular interface, the Imp Character Editor, in which agent content is entered.

[0015] **FIG. 2** illustrates the top level of the Imp Character Editor.

[0016] **FIG. 3** shows 14 built-in moods of the Moods section of the Editor.

[0017] **FIG. 4** shows the Mood Screen for the mood Excited.

[0018] **FIG. 5** is a mood diagram showing where each mood lies in a Wellbeing-Energy plane.

[0019] **FIG. 6** shows the Mood Screen for creating the mood Despondent.

[0020] **FIG. 7** shows the Mood Testing feature.

[0021] **FIG. 8** shows built-in gestures of the Gestures section of the Editor.

[0022] **FIG. 9** illustrates entering a new keyword in the Character Global section.

[0023] **FIG. 10** shows the Keyword Properties screen.

[0024] **FIG. 11** shows the Keyword Sharing form.

[0025] **FIG. 12** illustrates creating a new token group.

[0026] **FIG. 13** illustrates making entries in a new token group.

[0027] **FIG. 14** shows the Backstory chat topic.

[0028] **FIG. 15** shows the Multiple Dialog screen.

[0029] **FIG. 16** shows the Single Dialog screen.

[0030] **FIG. 17** shows Preconditions grouped under a subnode.

[0031] **FIG. 18** illustrates making dialog dependent on mood.

[0032] **FIG. 19** illustrates setting a mood to change in response to a keyword.

[0033] **FIG. 20** illustrates making entries into the word group #User.

[0034] **FIG. 21** illustrates selecting a Stop using Go To Stop.

[0035] **FIG. 22** illustrates a new Web Guide Application with one stop.

[0036] **FIG. 23** is a block diagram of an authoring system containing the agent editor of the present invention.

DETAILED DESCRIPTION

[0037] Although the following detailed description contains many specifics for the purposes of illustration, anyone of ordinary skill in the art will appreciate that many variations and alterations to the following details are within the scope of the invention. Accordingly, the following preferred embodiment of the invention is set forth without any loss of generality to, and without imposing limitations upon, the claimed invention.

[0038] The present invention provides a method for authoring interactive computer-controlled agents. An author enters content information that will be accessed by a run-time engine at a later time to operate the interactive agent. An important feature of the invention is that all content provided by the author is correlated with at least one particular context in which the content will be use. Each potential context is provided to the author (or selected by the author) so that he or she can enter the content information without having any knowledge of the underlying mechanism by which the run-time agent uses the content.

[0039] The following terms are used throughout this description:

[0040] A context of an agent is a combination of a plurality of alternative values for each of a plurality of state variables of the agent, where the values of the state variables co-occur, either simultaneously or in sequence, during an operation of the agent.

[0041] A potential context of an agent is one that is identified prior to a particular operation of the agent and which may or may not occur during the particular operation of said agent. Potential contexts can be identified for the author or by the author.

[0042] An actual context of an agent is one that does occur during a particular operation of the agent.

[0043] A given actual context of an agent matches a given potential context of the agent if a value of a state variable in the given actual context matches a value of a corresponding state variable in the given potential context.

[0044] Content is any information that can be used to control an agent's behavior during operation. Content includes, but is not limited to, a line of dialogue, a symbolic gesture, a mood change, storage of data in a database, reading data from a database, a command to drive a browser, a specification of an animation, a specification of a browser, or a timing specification.

[0045] A simple example of the invention is a context of an agent Izzy based on values of two state variables, IZZY MOOD and USER INPUT.

[0046] IZZY MOOD is of the form: Sign Mood-Name

[0047] Sign can be one of: Not or blank

[0048] Not→complement of Mood-Name

[0049] Mood-Name can be one of: Happy or neutral or angry or furious or any

[0050] Any→happy or neutral or angry or furious

[0051] Furious→angry or furious

[0052] USER INPUT is of the form: Sign Prefix X

[0053] Prefix can be one of: What-is or Any-mention-of

[0054] What-is can be: What . . . is . . . X . . .

[0055] Any-mention-of can be: . . . X . . . .

[0056] . . . can be: any sequence of 0 or more words

[0057] X can be #catnip

[0058] #catnip can be one of: catnip or cat nip or plant . . . cats like

[0059] Examples of 4 Potential Contexts (PCs) of the Agent Izzy

	IZZY MOOD	USER INPUT
PC1:	Not Angry	What-is # catnip
PC2:	Angry	What-is # catnip
PC3:	Any	Any-mention-of # catnip
PC4:	Happy	Any-mention-of # anything

[0060] Examples of 5 Actual Contexts (AC) of the Agent Izzy

	IZZY MOOD	USER INPUT
AC1:	Neutral	What in the world is cat nip?
AC2:	Furious	What the heck is that catnip stuff?
AC3:	Happy	I would like to get some of that plant that cats like.
AC4:	Happy	I have a big black cat.
AC5:	Happy	Where is the game area?
AC6:	Furious	Where is the game area?

[0061] Examples of Matches between Actual Contexts and Potential Contexts of the Agent Izzy

AC1	matches	PC1	- - -	PC3	- - -
AC2	matches	- - -	PC2	PC3	- - -
AC3	matches	- - -	- - -	PC3	PC4
AC4:	matches	- - -	- - -	- - -	PC4
AC5	matches	- - -	- - -	- - -	PC4
AC6	matches	- - -	- - -	- - -	- - -

[0062] t,0072

[0063] Example of Content authored for 2 Potential Contexts of the Agent Izzy

	IZZY MOOD	USER INPUT
PC1:	Not Angry	What-is # catnip

Authored Content includes 4 elements:

1. Set User_Mentioned Catnip = True
2. Increase User_Curiosity Slightly
3. Perform Gesture = Talk
4. Say one of the following, with Probability p:
   a. "A feline's favorite controlled substance!" p = .1
   b. "A cat's idea of the perfect martini!" p = .1
   c. "A one-way ticket to feline frenzy!" p = .1
   d. "Pure Heaven, # User!" p = .7

PC2:	Angry	What-is # catnip

Authored Content includes 4 or 5 elements (element 5 only in the context of Say 4c):

1. Set User_Mentioned_Catnip = True
2. Increase User_Curiosity Slightly
3. Perform Gesture = Talk

-continued

IZZY MOOD	USER INPUT

4. Say one of the following, with Probability p:
   a. "A cat treat." p = .4
   b. "Something cats like." p = .4
   c. "What do you care, # Bad_User_Nickname" p = .2
5. Increase Izzy Rude_to_User Slightly

[0064] Typically, the invention is implemented with many more potential contexts based on more than two state variables. An example of a more realistic application, the Imp Character Editor, is described below for use in authoring a particular agent, an Extempo Imp Character. Extempo Imp Characters carry on conversations with humans using natural language technology. The Imp Character Editor allows complex Imp Character Natural Language Understanding (what the Imp Character will understand) and Natural Language Generation (what the Imp Character will say in response) to be authored. An Imp Character Editor is an interface to a database. It identifies a potential context of an agent to an author, receives input from the author, and stores the content in a database. It is to be understood that the Imp Character Editor example is for illustration purposes only, and in no way limits the scope of the invention.

[0065] FIG. 1 illustrates a particular interface, the Imp Character Editor, for providing agent context to an author. The left pane of the interface contains a tree that indexes all of a character's information, while the right pane is the "work surface" in which authors enter and customize keywords and dialog. That is, the left side provides a structure of potential contexts, and the right side provides an interface in which the author enters content for a selected context. In this particular example, an agent, Izzy, has a number of potential contexts for which content can be defined by the author. The highlighted phrase, "Do you like," is a value of a state variable representing words input by a user. If, during operation of the agent, an actual context occurs in which a user asks Izzy whether he likes cats, the potential context shown is matched, and Izzy will respond with the authored content, "You bet I do. Cats are great!!" Note that the author does not need to know any of the surrounding actual context in which the agent's response will be given.

[0066] The Imp Character Editor provides agent context in a graphical user interface with a structural layout. However, the invention can be implemented using any presentation method including, for example, auditory media.

[0067] Basic Terms and Concepts

[0068] The following terms are specific to the Imp Character Editor and are used in reference to this particular illustration of the invention. A character is a particular example of an agent. It is to be understood that the use of the word character in no way limits the scope of the invention.

[0069] ImpEngine. The ImpEngine is the run-time application that allows an Imp Character to carry on a conversation. It accepts and matches input from the user against the framework you create when you author a character, and then produces appropriate output from the framework.

[0070] Imp Utterance. An Imp utterance is something the Imp Character says. Every piece of dialog a char-

acter speaks is an Imp utterance. Single Imp utterances can be terse: "Don't think so;" or only part of a longer story sequence: "Let me tell you what happened to my friend Bob last week . . . "

[0071] User Utterance. A user utterance is something a person interacting with an Imp Character says. A single user utterance is composed of the words entered when the user types into the Imp Character's text box, then hits Send or Enter. "How are you, Izzy?" is an example of a user utterance.

[0072] Log. All interactions between a user and an Imp Character are recorded. A log contains all of the Imp and user utterances as well as technical information such as the cues and gestures that are associated with each utterance. Logs are not terribly human-readable and are "stripped" into transcript form using the Extempo Log Analyzer.

[0073] Transcript. A transcript is the human-readable form of a log. It contains a complete record of the things said in a conversation between an Imp Character and by the user.

[0074] Natural Language Understanding, or NLU, refers to the way a character understands what a user said. Extempo's NLU technology at its most basic level is based on matching user utterances to word patterns that an author anticipates and creates in the Editor. Every word pattern a character is meant to understand is part of its NLU. NLU is case-insensitive and highly customizable. There are two kinds of NLU, built-in NLU and custom NLU.

[0075] Built-in NLU refers to the generic keywords and phrases that are automatically available to and understood by every Imp Character. They include common words that mean the same thing, like the names for different colors (found in a Token Group called #kindOfColor), or other common words that constitute topics for conversation, like "TV,""Who are you?" etc.

[0076] Built-in NLU is available to you as you construct your custom NLU, but its constituents are not visible in the tool. Much built-in NLU constitutes every Imp Character's chat topics.

[0077] Custom NLU refers to special words and phrases added by a character's author. Custom NLU is an example of a potential context defined by the author. They can be single words, or when token groups are included, can include built-in NLU to make more complex patterns. Each author adds specific words and phrases so that their character will understand them. Examples of custom NLU are the keyword "purr" added to a cat character, or the keyword "reindeer" added to a Santa character. Here also is an example of a keyword pattern that incorporates a built-in NLU token group: Are your reindeer #kindofColor?

[0078] When a user's input matches a piece of NLU, the Imp Character will respond with the related piece of dialog. This is Natural Language Generation (NLG). A piece of dialog is an example of authored content.

[0079] Natural Language Generation, or NLG, refers to the dialog a character will speak when a user utterance (an actual context) matches a word or phrase in its NLU (a potential context). Every line of dialog you write is part of NLG.

[0080] Natural Language Understanding and Natural Language Generation (NLG) are inextricably linked—keywords generally lead to some form of dialog to speak when the character receives a particular input. The bulk of a character usually exists in custom (not built-in) NLU and associated NLG. Without custom language understanding and generation, your Imp Character could not have special interests, knowledge, or intelligence.

[0081] Entering Basic Content

[0082] **FIG. 2** illustrates the top level of the Imp Character Editor. Expanding the top level of the tree reveals contexts that are applicable to the character at all times. These include global properties that can be set or modified.

[0083] It is highly recommended that you do extensive planning before you begin work on your character inside the Editor. Typically the creation of a "character bible" entails a description of the character's backstory, some sample dialog so you can pinpoint the character's voice, and a description of what the character looks like physically. Once you have written these, you can paste the relevant sections into the Backstory Description and Sample Dialog boxes, and use the provided button to select an image for the Physical Description from a local drive. That way, any future writers will be able to quickly get a feel for your character: its personality, what it might talk about, and how it might talk about it. You will also find it easier to author your character when you have its motives and characteristics laid out in advance.

[0084] Imp Characters have the capacity to have moods that change based on their interactions and regress to "normal" based on their personalities. Like humans, they can anger when insulted and brighten up when praised. An agent mood is a component of a variety of potential contexts. For example, potential contexts include user input that communicates a message about the agent's mood; a change in an agent mood; delivery of a message by the agent relating to the agent's mood; or simply the mood itself. A mood is often one state variable that makes up a context based on a number of state variables.

[0085] Moods can be emotions or manners. Emotions include active, depressed, ecstatic, mellow, tired, very happy, very sad, happy, sad, angry, depressed, content, surprised, excited, elated, furious, and neutral. Manners include aggressive, submissive, active, passive, friendly, shy, quiet, chatty, energetic, reserved, curious, indifferent, aroused, polite, rude, edgy, humorous, and knowledgeable.

[0086] The Imp Character Editor uses a Mood System to give an agent a unique style of emotional response. Using these functions, you can easily make your character quick to anger or quick to forgive, as well as build your own emotional states if you so desire. An advanced use of the Mood System might be to model the user's mood based on the words they use and then customize the interaction based on what you perceive is the user's state of mind.

[0087] Two mood dimensions are built into every character by default: Wellbeing and Energy. Wellbeing is the general way the character "feels," and Energy is a measure

of how energetic the character is. Different levels and combinations of these dimensions yield different moods.

[0088] You are already undoubtedly familiar with humans who are only briefly bothered by a cross word, but also with others who hold a grudge for a long while. Imp Characters can have these "personalities" as well. Regression Speed refers to how quickly a dimension returns to "normal" when affected. For example, setting Wellbeing's regression speed to Slow means that if a user comment affects its wellbeing, it will take a long time for Wellbeing to return to its normal state by itself. If the user insulted the character (and then did not do anything else to affect wellbeing for the rest of the interaction), the character's Wellbeing would take much longer to recover than it would if the regression speed was set to Fast.

[0089] If regression speed of either, or both, dimensions is set to None, the value of the dimension will be saved in a database at the conclusion of the interaction. If the same user returns to visit the character, the character will begin with that mood value instead of beginning in the "default" mood.

[0090] Under Mood Dimensions, you have the option of adding extra custom dimensions to your character and creating new moods under those dimensions, discussed below.

[0091] **FIG. 3** illustrates a variety of potential moods. The fourteen possible moods already built into each character, listed in **FIG. 3**, are based on the two dimensions Wellbeing and Energy. Here is a brief explanation of how the moods are generated. There are six possible moods that stem from one dimension by itself. Four moods are based on the value of Wellbeing alone:

Wellbeing			
Very Low	Low	High	Very High
Very Sad	Sad	Happy	Very Happy

[0092] Two moods are based on the value of Energy alone:

Energy	
Low	High
Tired	Active

[0093] Combining the two dimensions yields seven more complex moods:

		Wellbeing			
		Very Low	Low	High	Very High
Energy	Low		Depressed	Content	Mellow
	High	Furious	Angry	Excited	Ecstatic

[0094] A final mood, Neutral, is at the middle of Wellbeing and the middle of Energy.

[0095] All of the 14 listed moods are fully customizable. When you click on one of these moods under the Moods section, the Mood Screen will appear on the work pane, as illustrated in **FIG. 4**. In each screen, you will see the name of the mood and the following options:

[0096] Add a Constraint For

[0097] If you had added any extra mood dimensions to your character, you can make any given mood constrained by that mood dimension by adding it here. Click the button to add the constraint, then select the dimension from the pull-down menu.

[0098] Wellbeing Range of Values

[0099] Customize the Wellbeing range of values using the sliders. A slider is a marker you move along a range of values. You can see the two triangles that function as sliders on each range of values for this mood. Using the Wellbeing sliders, you specify a range of wellbeing in which this particular mood applies. The two triangles are set to a default range when you first open a mood.

[0100] For example, opening up the mood Excited shows you that for the character to be Excited, the character's wellbeing must fall in the interval from about 1.2 tick marks to 4. If you would like the character to become Excited less frequently, you may make the interval smaller by moving the triangles closer together at the upper limit of the axis. Please note that the values of the tick marks are arbitrary, as there is no numerical scale on the slider—the ImpEngine actually calculates the numbers in a more complex way than what is seen.

[0101] Energy Range of Values

[0102] The Energy sliders function the same way as the Wellbeing slider.

[0103] Some moods (like Active) are controlled only by the Energy slider, while some moods (like Happy) only use the Wellbeing slider. Other moods exist as an interaction between the two dimensions. It may be helpful for you to graph out your characters' mood dimensions and interactions on their axes so you can visualize how your moods interact and overlap. **FIG. 5** is a mood diagram for the two-dimensional moods in the Imp Character Editor. Note that the values 4 and –4 are entirely arbitrary; only the relative areas of each mood and their positions on the plane are important. You can think of your character's mood as a point on the plane. When the interaction touches on topics that deal with mood, that point might move towards another area on the diagram. If the point moves into another square, there would be an actual change of mood.

[0104] As you can see from this diagram, some moods are subsets of other moods. For example, a character that is Furious is also Angry, but a character that is Angry is not necessarily Furious. The overlap becomes important when you are assigning mood values to dialog (described below).

[0105] Custom Moods

[0106] You can also create your own moods. For example, you might notice that in the Editor, there is no mood set to the default of Very Low Wellbeing and Very Low Energy.

FIG. 6 illustrates the creation of the mood "Despondent" to cover this case. Enter the name of the mood into the first empty box under Moods, then go to its entry in the tree to set its slider values to very low.

[0107] You can also use custom moods in conjunction with a third dimension to track other things, such as aspects of the user. For example, you might add a third dimension "Car Savviness" to a car salesman character, and under it create moods "Not Car-Savvy" and "Car-Savvy." Your NLG would then contain lines such that if the user used a specific car-savvy word (like "torque"), the character's "mood" would become "More Car-Savvy." It could then use this mood to tailor its subsequent choice of words for the more car-savvy user.

[0108] Start Mood

[0109] In the pull-down box (FIG. 3), select a Start Mood for your character. All interactions with this character will begin with the character in that particular mood. Most characters start out at Neutral, but you can make a grouchy character always begin as Angry, while a nicer fellow might always begin as Content.

[0110] Specificity Scaler

[0111] The Specificity Scaler lets you indicate how important you want mood to be when your character is selecting what dialog to say. Five options are available in this pull-down menu. For example, at one point you might have three available pieces of dialog written for one keyword, to be used when the character is Happy, Ecstatic, or finally any mood in particular. Imagine that during a particular interaction, your character is Ecstatic when that section of dialog is triggered and the ImpEngine needs to pick a line to say. Because a character who is Ecstatic is also Happy (Ecstatic is a subset of Happy), all three lines are applicable. Specificity Weight helps determine which line of dialog it picks. If Specificity Weight is set to None, the character will pick randomly from the three lines. If Specificity Weight is set to Slight, the character will be slightly more likely to pick a line for the more specific mood, in this case, Ecstatic. If Specificity Weight is set to Linear, the chance for picking each line of dialog is inversely proportional to the mood's area. In this case, there would be a higher probability that the Ecstatic line would be picked. If Specificity Weight is set to Heavy, it will be much more likely to pick the line for the most specific mood. If Specificity Weight is set to Most Specific Only, the character will only pick the line with the most specific mood, in this case the Ecstatic line of dialog.

[0112] FIG. 7 illustrates the Mood Testing features, which lets you experiment with the Wellbeing and Energy values to see the moods that apply at various points on the sliders.

[0113] Move the sliders around to see the applicable moods. In addition, setting a Specificity Weight under Moods and then looking at various Wellbeing and Energy values under Mood Testing shows you what moods have what specificity, which is the relative weight a line of dialog with that mood would have. In this example, Specificity Weight was set to Heavy. If two lines of dialog for Happy and Ecstatic were available, the Happy line in this case would be weighted at 178,507 while the Ecstatic line would be weighted at 849,347, so the Ecstatic line would be about 5 times more likely to be selected. These numbers change depending on what was selected on the Specificity Scaler. If Most Specific Only is selected, the ImpEngine will only select the line with the greatest specificity.

[0114] FIG. 8 illustrates gestures available to an agent. Gestures are an example of authored content and tell your character's image what to do physically when it says a specific line of dialog. Each line of dialog has one gesture associated with it. Gestures relate to the art you develop for each character, but not in a one-to-one relationship; there may be multiple images or animations associated with each type of gesture, in which case the ImpEngine will pick amongst them for one to display.

[0115] All lines of dialog begin with the Default Gesture until you change the selection individually. The Talk gesture is the most common gesture, so it is preselected to be the default gesture. You can choose another gesture to function as the default if you feel your character warrants it.

[0116] Approve. This is what the character does when it is pleased with something the user said. An approve gesture typically is a tacit acknowledgment of something the user said (e.g. the character nodding his head happily after the user said "I like you!"), rather than just the character looking happy.

[0117] Disapprove. This is what the character does when it is not pleased with the user. They should not look too mean as they may also Disapprove when they receive mild insults.

[0118] Goodbye. This is what the character does when the user says goodbye. This can be generic (a wave) or character-appropriate (a magician disappears in a puff of smoke).

[0119] Greet. When the character first arrives, they usually wave or make some acknowledgment of their arrival.

[0120] Idle. When the character is waiting for a response to a question and the user delays a while, the character may look away, file its nails, whistle, etc. However, it should not appear to ignore the user entirely. The point of the idle gesture is to give users the reassurance that the character is not staring them down at all times, and yet the gesture should also subtly cue them to resume the interaction.

[0121] NonComp. This is what the character looks like when it doesn't understand what the user said. Noncomp is short for "non-comprehended dialog." Examples of things the character should do when it does not comprehend are: look confused, shake its head, etc. The character should do as much as possible (visually as well as verbally) to deflect blame from the user for the misunderstanding.

[0122] Sleep. When the user has not said anything for quite awhile, the character might "go to sleep." Keep in mind that this doesn't mean every character should literally appear to go to sleep; users may find it somewhat rude when humans go to sleep in the middle of a task, for example. The "sleep" gesture can be something a character does, appropriate to its persona, which does not involve the user. However, it should still be obvious from looking at the character that it will not be rude for the user to "wake" the character and continue

the conversation. The character should be doing something, but not something terribly important.

[0123] Talk. This is the most common gesture; it is something the character does when it's just talking. It can gesture vaguely around the page or just adopt a casual stance.

[0124] Walk. If your character is a tour guide, it can move from page to page by "walking" or otherwise indicating forward progress.

[0125] Yawn. This is what the character does immediately before falling asleep.

[0126] Other default gestures include agree, disagree, refuse, ask, explain, think, suggest, flirt, and look-confused.

[0127] Custom Gestures. You can add custom gestures into the blank box at the bottom of the Gestures list. Custom gestures are useful for making your character do something unique to that character. For example, Merlin's author added a custom gesture called Crystal Ball. When a line of dialog calls for this gesture, Merlin takes out his crystal ball and gazes into it. There is no limit to custom gestures save the extra download time extra images may impose.

[0128] A precondition is a further example of a potential context of an agent. Preconditions customize interactions based on what a character knows or has learned during the interaction, or what is stored in a database from a previous interaction. It is easier to create preconditions as you are writing dialog than to enter them here, but occasionally you will want to create your own preconditions by handcoding them. Once the preconditions are entered, you can use this part of the Editor to associate preconditions with a particular role or change the precondition's value.

[0129] Log cues are preconditions that are used to help catalog behaviors and topics of interest as they occur in real interactions. You attach log cues to specific lines of dialog as you are authoring. When a character uses a particular line of dialog with log cue attached in a real interaction, the ImpEngine writes the log cue into the raw log. Later, you can count the number of times the log cue occurs in a set of transcripts by using the Log Analyzer (see the Extempo Log Analysis Tools Manual), and perform a variety of analyses.

[0130] You create log cues in the top level of the character, but attach the log cues to single lines of dialog as you are writing. For example, you may have a character who works on a site that has a shopping page, which it sometimes invites users to visit. You may want to track your character's success at getting people to go to the page by putting a log cue on both the question and the response(s) to the user's answers.

[0131] Example (Cooperative user):

[0132] Character: Do you want to go to the shopping page? (Log cue: AskedShopping)

[0133] User: Sure

[0134] Character: Great, let's go shopping! (Log cue: TookUserShopping)

[0135] Example (Uncooperative user):

[0136] Character: Do you want to go to the shopping page? (Log cue: AskedShopping)

[0137] User: No

[0138] Character: OK, maybe later. (Log cue: NotTookUserShopping)

[0139] Later, you could divide the number of times the character did TookShopping by the number of times the character did AskedShopping to calculate the character's success rate for talking people into visiting the shopping page. (If the rate was low, you might want to reevaluate the character's persuasion techniques.)

[0140] The log cue system may sometimes seem cumbersome because log cues only attach to lines of dialog the character speaks, when sometimes it's the user utterance you're most interested in. Nonetheless, log cues are extremely important tools for tracking aspects of your character's conversation. You should map out areas of interest within your character, plan your log cues in advance, and begin adding them at a very early stage of character development.

[0141] Some log cues are built-in and are automatically attached to certain areas in the built-in chat topics. Use this section of the Editor to enter the names of custom log cues, which you will later use as you are writing dialog. You must also give each log cue a unique ID number in the ID box when you create them. Numbering them sequentially (1, 2, 3 . . . etc.) is fine.

[0142] Keywords

[0143] A keyword is a pattern that the Imp Character looks for in user inputs, i.e., a potential context in the which the value of a state variable is a specific word input by a user. Keywords can be as simple as one letter alone, or can be long phrases, patterns of words, or even full sentences depending on the author's needs.

[0144] Imp Characters need to recognize a wide variety of keywords and patterns so they can produce varied dialog in response, and also track and store various items of information. Authors add custom keywords (author-defined contexts) to give their characters breadth of knowledge.

[0145] Keywords appear in many places in the Imp Character Editor: in the top level of the character itself there are Character Global keywords, then there are progressively more specific keywords in Chat Topics, Web Guide Applications, and as After-Dialog Keywords (all discussed below). When you add keywords, the Editor provides a place for you to author custom responses to these keywords.

[0146] **FIG. 9** illustrates one method of adding keywords into the Editor. Click on the bold Keywords heading in the chat topic or section of the Editor you are working on. If you are working with a new character, you may want to add new keywords to the Character Global section or the Backstory Chat Topic. The Keywords window will appear in the work pane. Type the new keyword into the first empty text box and press Return.

[0147] The keyword will now appear as a new entry in the tree below that particular Keywords heading. Clicking once on the new keyword in the tree opens up the Keyword

Properties Screen, shown in **FIG. 10**, giving you the following options for how you would like your Imp Character to handle the keyword.

[0148] Setting a keyword's Importance lets the character choose which of several keywords to favor, in case a particular user input matches multiple keywords. For example, you might have two keywords, "Los Angeles" and "Los Angeles Times." The words "Los Angeles" are contained within "Los Angeles Times." If these two keywords have the same Importance and a user says "I like the Los Angeles Times," the ImpEngine will match the shorter of the two; in this case the keyword "Los Angeles" would be triggered instead of "Los Angeles Times." To correct this, make the importance of "Los Angeles Times" higher than "Los Angeles." Doing this ensures that the character will "see" the longer keyword, and respond about the newspaper instead of the city.

[0149] Importance is also useful for directing the conversation to topics about which your character knows more. For example, if the words "house" and "Montana" were keywords with the same importance, and a user said, "My house is in Montana," the character might choose randomly between the two keywords when picking what to respond to. However, you might want your character to be on the lookout for "Montana" because it knows a lot about Montana, and you think "Montana" is more interesting than "house." Give "Montana" higher importance to make sure your character chooses the topic of interest. The more specific the topic, the higher the importance should be.

[0150] Different keyword areas in the Editor have different default Importance values. You can look at the importances of the keywords in different sections to get an idea of how specific different sections are considered to be. For example, the Character Global section's keywords have default importance **74** the Chat Topics keywords have default importance **84**, and the Web Guide Application keywords have default importance **94**.

[0151] Using the pull-down menu next to the keyword box, you can set the Importance of any keyword to Very Low, Low, Normal, High, Very High, or Custom. All Importance settings except Custom have a built-in number value. When you select Custom, simply enter a value into the box.

[0152] Keyword sharing lets you share authored keywords and dialog to different Keywords sections of the Editor. However, you should not use this feature if you want the keywords to have different functions in different sections of the Editor. If you share a keyword, any changes you make to the keyword and the corresponding dialog will automatically share to all of the other places as well. You should not share a keyword if you want to change its responses for one section and not for the other.

[0153] Clicking on the globe button accesses a form, shown in **FIG. 11**, that allows you to share keywords to multiple areas of the Editor. This is useful if you have a keyword authored in a very specific Chat Topic, for example, that you would like to make part of the global character keywords. When you use this form to share the keyword to another place in the Editor, the Editor shares the keyword and any associated dialog as well.

[0154] To share or unshare a keyword to any of the given areas, click on the area and use the Up or Down arrows to move it in or out of the upper part of the window. Keyword Sharing can become very tedious when you have a lot of keyword areas in your character, however, because you can add After-Dialog Keywords to any line of dialog, and all of those keyword areas will appear here as well. If you do have a lot of After-Dialog keywords and need to tell the keyword areas apart, clicking the small "Load After-Dialog Sample Dialog" box will load some dialog for those areas (this is not default because it can take some time).

[0155] Question Stems are predefined patterns of words that may occur in conjunction with a keyword. Some of them are common questions, like How . . . or Why . . . while some are statements, like Tell me more about . . . Checking one or more of these boxes tells your character to look for those patterns of words. With a keyword "catnip," checking the box What tells the character to look for user inputs that contain the pattern "What . . . catnip" (with or without intervening words). A common user input that matches this pattern might be "What is catnip?" Checking the (any mention of) box ensures that your character always notices when a particular keyword is mentioned, even if it does not match any other question stem pattern. You should generally check this box for any keyword you author and add some dialog so the character will always have something to say.

[0156] Obviously, not all keywords make sense with all of the question stems. "Are you catnip," for example, does not make sense. When you associate question stems, you only need to check the most logical boxes. Then you can author responses for each likely question. Look at your keyword and mentally evaluate how many of the available question stems make sense with this particular keyword. In the work pane, check the boxes for the most likely question stems. You will see a new entry appear in the tree below your keyword for each checked question stem.

[0157] Just as you would not check question stems that do not make sense with your keywords, make sure not to check question stems that don't make sense with all of your alternative wordings as well. You should try to use the question stems instead of duplicating them in your keywords—for example, use the "What . . . " question stem instead of using "what is" in your pattern wherever possible.

[0158] Entering a number of alternative wordings or synonyms saves you from creating new keywords for similar concepts. For example, if you had a keyword "San Francisco," you would want your character to understand common words and phrases that also mean "San Francisco," such as "SF,""s.f.," and "Frisco." You can enter each of these under Alternative Wordings so that your character will understand each alternate term as an equal match for the "San Francisco" keyword. (Of course, if you wanted your character to understand "Frisco" slightly differently from "San Francisco" so that it could comment "No one in California calls it that," you could add "Frisco" as a separate keyword altogether.)

[0159] You should also use Alternative Wordings to help your character catch common misspellings of your keywords. A good example for "San Francisco" is "San Fransisco," which is a misspelling you could probably expect users to make frequently. Adding common misspellings to Alternative Wordings increases your character's comprehension of real users'seldom-perfect typing.

[0160] You can add as many Alternative Wordings as you like to a keyword, but if you find yourself adding a lot of

them, you may want to add them to a token group instead. Token groups, which are groups of related words or phrases, give keywords flexibility and depth while alleviating overuse of the Alternative Wordings feature. In general, token groups define a group of words that can all be treated as synonyms or members of a category. Token groups are then used as keywords or as parts of keywords.

[0161] For example, you could create a token group #miscPets and include in it these items: "cat&,""dog&,""hamster&," etc. When the user says "hamster" or "hamster's," the input will match keywords made with #miscPets like [any mention of] . . . #miscPets. This allows your character to know the user is talking about an animal that could be a pet, though it won't understand specifically which one. Still, your character can respond with general dialog about animals, instead of responding about hamsters in particular, and thus keep the conversation moving: "Speaking of pets, I just love cats." With token groups, you won't have to create a special keyword for each group member unless you want to.

[0162] There are two types of token groups: Predefined Token Groups and token groups that you create from scratch.

[0163] Predefined token groups are mostly groups of common English words and phrases. An example of a predefined token group is #you, which contains the words "you,""u, ""ye," and "yerself" amongst others. Instead of creating an alternative wording with each of these options each time you make a keyword that requires the word "you," using the token group #you in the keyword covers all of them at once. The more predefined token groups you use, the greater the chance that an utterance will match something you might not have otherwise considered adding. Inductive Authoring makes it easy to find matching token groups.

[0164] Some predefined token groups are capitalized, like #LAUGHS or #YES or #NO. These token groups are only supposed to be used as a full keyword, not in a phrase or a longer pattern. You can have the keyword #NO but not the keyword "#NO way Jose." All Imp Characters understand predefined token groups, which you can use to build your keywords at any time. To use a predefined token group, simply type it as part of a keyword.

[0165] To complement the predefined token groups, you can create an unlimited number of custom token groups. They will contain words and phrases that your individual character will know and recognize. For example, if you had made the aforementioned special token group #miscPets for the abovementioned words, using the two predefined token groups #you and #like, you could then write a keyword #you #like #miscPets. Your character will then recognize the inputs "you like cats?" as well as "do u love cats?" and understand they mean the same thing.

[0166] **FIG. 12** illustrates how to create new token groups. In the top level of your character, click on the Token Groups heading. Enter the name of your new token group into the first empty box in the work pane (the name must be preceded by a # character). This will create a new token group entry in the tree. Clicking on the new tree entry provides a screen **(FIG. 13)** in which you can enter all of the words you wish to include in the token group. There is no limit to the number of entries in a token group.

[0167] Following the naming conventions used in the built-in token groups helps you keep track of the token groups you create. Synonyms are named after one of the common words. For example, #fast might contain "fast, ""quick,""speedy." Hyponyms are named #kindOfCategory. For example, #kindOfTree might contain "oak,""elm, ""ash," and "pine." Token groups that don't fit either of those categories are named #miscSomething. For example, #miscWeather might contain "weather,""cloud,""rainstorm."

[0168] User utterances that match a side effect keyword are recognized and evaluated, but the character does not say an authored response to the keyword. However, a different kind of content is authored for the potential context of a side effect keyword. This allows you to create "transparent" side effects such as mood shifts, stored variables, etc., all of which are considered to be content that partly controls an agent's behavior. An example of a side effect keyword that affects mood is #Insults. If a user said, "Tell me about New York, you moron," the character would understand the comment about New York, but also know it had been called a moron, resulting in a mood shift. If you had a lot of mood-dependent dialog, it could potentially respond about New York in an appropriately testy manner.

[0169] The syntax for making a side effect keyword is including the tag <SIDEEFFECT> in the keyword: <SIDEEFFECT># Insults. You do not have to use the tag on the keyword's alternative wordings. When authoring dialog to "respond" to a side effect keyword, it must be in the form of a Fact (see below for discussion of Action Types). The dialog is not actually spoken, but nonetheless requires an action type.

[0170] Keywords can be simple, one word entries. Keyword annotations, however, allow you to create more complicated and more specific keywords, like patterns and phrases. The more specific your keywords, the more specific your Imp Character's understanding can be.

[0171] Consequently, your character will seem more intelligent in conversation. Here are the annotations you can use:

[0172] The three dots, or ellipsis (. . .), are used between words in the keywords when you want the Imp Character to recognize words even if they're not immediately adjacent. For example, you enter a keyword "my friend," with no ellipsis. Without the ellipsis, the character recognizes the phrase "my friend" only if the words appear in that order and directly next to one another. The character understands the user's comment "I love my friend," but not the comment "I love my best friend." If the keyword is entered as "my. friend," the character understands both comments. The ellipsis informs the Imp Character to only look for the words "my" and "friend" with any intervening words ignored.

[0173] The ampersand (&) is used to extend a keyword to cover plural and possessive forms. Entering a keyword "dog" will not cover the inputs "I love dogs" or "My dog's name is Rex." Making the keyword "dog&" covers these inputs.

[0174] The character understands the word or words immediately following the @begin annotation if and only if they are at the beginning of the user's input. You can use this annotation to trap words that have one meaning if they appear at the beginning of an utterance but another meaning if they occur in the middle of a sentence. For example, if the keyword is entered as "@begin cool," the character under-

stands the comment "cool" (a brief pithy comment) but not "My teacher is really cool" (a fact to be comprehended).

[0175] The character understands the word or words immediately following the @end annotation if and only if they are at the end of the user's input. You can use this annotation to trap words that have one meaning if they appear at the end of an utterance but another meaning if they occur in the middle. The keyword "my friend here @end" would be an excellent way to catch the questions "Why is my friend here?""Was my friend here?" or "Is my friend here?" while ignoring comments like "My friend here is an engineer."

[0176] The @any annotation represents any single word (the ellipsis represents any number of words). Use it when there is a variety of words that might be expected that do not change the meaning of a phrase, but are required to be there. For example, perhaps your character's been talking about its friends. The user might refer to the character's friends as "you talked to those friends,""you talked to these friends, ""you talked to your friends," etc. Enter the keyword as "talked to @any friends" and the character will allow any word to appear between "to" and "friends."

[0177] The @anyInteger annotation represents any single integer number. Use it when you expect a number, but don't know what it will be. Example: The keyword #I am @any-Integer years old would match the user inputs "I am 6 years old,""I am 46 years old," etc. (It will also catch "I am 2000 years old," of course.)

[0178] Every character will have a large set of keywords. However, there is a tradeoff between the number and complexity of a character's keywords and the speed of the character's responses. Avoid adding keywords and alternative wordings just for the sake of having more keywords and alternate wordings. You should always have reason to believe that a new keyword or alternate wording will occur with some frequency in actual use.

[0179] Chat Topics are another component of a potential context. Chat Topics are essentially extensive sets of pre-authored keywords for an assortment of topics in which you can author custom dialog. Examples of chat topics include movies, art, shopping, animals, cleaning, music, sports, holidays such as Christmas or Valentine's Day, the Internet, a company, friends, people, the environment, and jokes. Like moods, chat topics are components of a variety of different potential contexts. For example, a user input can refer to a chat topic; an agent can deliver a message to the user referring to the chat topic; or an agent can have knowledge of a chat topic, including chat topics that were previously mentioned by the user or agent.

[0180] **FIG. 14** illustrates an interface for entering a chat topic. The Backstory Chat Topic includes a section for Interaction containing a subtopic Insults and Rudeness, under which is a "keyword" -like heading labeled Insults. Behind Insults, not visible in the Editor, Extempo has compiled a large group of words and phrases that constitute insults (everything from "I hate you" to "Your mother wears army boots"). They are like keywords that you don't have to author yourself or change. Whenever a user utterance triggers one of those keywords, the character will understand that it has just been insulted. You fill in some dialog for the heading so that your character has an appropriate response like, "You sure know how to make me feel sad."

[0181] All of the other keyword-style headings in the Backstory Chat Topic refer to similar lists of built-in words and phrases. Filling in every category in the Backstory Chat Topic gives broad coverage for your character's backstory, general manner of speaking and personality. Other available chat topics are the ExtempoInfo Chat Topic, the Company-Info Chat Topic, the Internet Chat Topic, and the Job Chat Topic.

[0182] Here are the formats for the text you will find in the Editor.

[0183] Brackets enclose generalizations of what the user might say: [I'm sorry.] User inputs that might match this heading are: "I'm sorry,""My apologies," etc. You fill in dialog that is the character's response to the user input. Quotation marks enclose generalizations of what the character's dialog should mean: "I like you." An Imp utterance you could write for this heading might be: "I certainly do enjoy our time together, my friend." Plain text denotes generalized topics of discussion: Movies. An Imp utterance you could write for this heading might be, "Speaking of movies, I liked Star Wars a lot."

[0184] Some Chat Topics include a field for Token Group Parameters. Token Group Parameters pertain to "built-in" token groups that the particular chat topic uses within the NLU, but you must define the entries in the token groups for each character because the entries will vary. For example, in the Backstory, Token Group Parameters are only needed for the token group #impName. #impName should contain all the ways users might say the character's name. Since the token group #impName appears frequently in the behind-the-scenes "keywords" that make up a chat topic, the token group must be filled in. Filling the token group in can be as simple as creating one entry for the character's name, or it can be more complicated (for Cupid, you could make #impName include "Cupid,""Eros,""God of Love," etc.).

[0185] When your character recognizes a keyword pattern in a user utterance, it needs something to say in response. That is, in the context of a particular word input from a user, the agent has particular dialog content.

[0186] Dialog

[0187] We have discussed how an Imp Character learns to understand user utterances by using keywords. Now, we will discuss how a character responds to user utterances with the appropriate Imp utterance, i.e. your authored dialog. Keywords, coupled with question stems, need lines of dialog to accompany them. **FIG. 15** illustrates a Multiple Dialog Screen in which author content is entered.

[0188] Go to the Keywords section of the Editor, enter some keywords, and attach some question You will then see new entries appear in the tree below the keyword for each keyword-stems. question stem combination you created. For example, you may have entered the keyword "catnip" and checked the question stems (any mention of), Do you like . . . and Tell me more about . . . You will then see the following entries appear in the tree:

[0189] (any mention of) . . . catnip?

[0190] Do you like . . . catnip?

[0191] Tell me more about . . . catnip?

[0192] Click on any of these headings to begin entering dialog. If you click on Do you like . . . catnip? you will see the Multiple Dialog Screen appear in the work pane.

[0193] This screen is called the Multiple Dialog Screen because it has multiple large text boxes for entering and viewing multiple lines of dialog at once. Usually, you will write multiple variations on each line of dialog; all of them would be summarized in this screen. For now, begin by entering one line of dialog in your character. In the first large empty text box on the Multiple Dialog Screen, begin typing your character's response to this keyword-question stem combination. When you are done typing the dialog into the box, the line of dialog will also appear in the tree. Click once on the line, or double-click it on the Multiple Dialog Screen, to see it in the Single Dialog Screen, **FIG. 16**. Any time you are editing a line of dialog, you will be in either a Multiple Dialog screen or a Single Dialog screen. In the Single Dialog Screen, you can apply extremely specific settings to the one line of dialog shown. Here are the features of the Single Dialog screen.

[0194] Click the Make Shared Dialog button to turn the dialog you have just written into Shared Dialog. Shared dialog is dialog that you know you will be using in multiple places in a character. If you know you will re-use a specific line of dialog later in a character, making it shared dialog makes it available for repeated use without requiring you to type it in multiple times. You can view and edit all shared dialog in the Shared Dialog portion of the tree in the top level of the character.

[0195] Recall that Preconditions may be triggered based on a character's actions during an interaction. The Create Precondition button (to the right of the main text box) creates a precondition that triggers when this particular piece of dialog is said. When you click on the button, you will be asked to name your precondition. Since the precondition activates when the line of dialog is used, name the precondition something that describes what this particular line of dialog is or does, i.e. Asked_UserAboutPets or Told_FishJoke. When the character uses this line in an interaction, it will automatically trigger this precondition (its default value is FALSE, so after it is triggered, it becomes TRUE). You can then use the Preconditions options as you are entering other dialog to control when and how a character might speak other lines based on the state of other preconditions. Preconditions grouped under a subnode are illustrated in **FIG. 17**.

[0196] You will sometimes write dialog that should only be used in certain mood circumstances. This dialog is entered in the Use When Mood boxes. Since users will only perceive your character's mood through the tone of its dialog, you should generally write different lines of dialog for different mood conditions. For example, in response to the keyword What . . . catnip, you could write several lines of dialog for different moods:

[0197] For general use:

[0198] Catnip is a plant that makes cats happy. I know I enjoy it.

[0199] If the character is happy:

[0200] Catnip is a wonderful, wonderful thing. It's terrific fun! I highly recommend it.

[0201] If the character is angry:

[0202] Catnip is a plant that some cats like. Not that you'd care, #User.

[0203] **FIG. 18** illustrates the Use When Mood option, which should be set for each of these lines to make sure your character says the line of dialog at the right time. Using the pull-down menus, set Mood options for each line of dialog. The first pull-down menu is either blank or has the value Not. The second pull-down menu contains all of the moods your character can have, including any custom moods.

[0204] Most of the time, you will just use the second menu to select the mood the character must be in before it can speak this line. Less frequently, you will use the Not option to let a character use this line at all times except in a very specific case. For example, you could decide a particular line should come up when the character is Not Ecstatic; the line could still come up when the character was Happy, Angry, Sad, etc.

[0205] You should always write at least one line of dialog for each keyword that is not dependent on mood (i.e., nothing is selected in the Use When Mood boxes) so the character will always have something to say if its mood does not match the other lines. When you compile your character, the Imp Character Editor will let you know if there is a mood case in which there potentially might not be any lines to say.

[0206] Weight is a way for the author to give some dialog a greater chance to be spoken relative to other dialog under the same keyword. Most keywords will have multiple possible responses; you may want to favor some responses more than others. Dialog with Weight=2 will be twice as likely to be selected as dialog with Weight=1.

[0207] Use Order to set the order that the dialog should be used to answer similar user utterances. That is, if a user triggers a keyword once during an interaction and later triggers the same keyword again, the character will say any response dialog with Order=1 the first time and any dialog with Order=2 the second time the keyword comes up. Multiple lines of dialog can have the same Order value. The character will not start over with Order=1 after it reaches the last ordered response, however; it will continue to repeat dialog of the last sequential Order, which you may want to use as an opportunity for your character to say, "Sorry, that's all I know on the subject."

[0208] Use the Precondition options to set parameters for when the character can use each line of dialog, based on preconditions'values when the dialog area is triggered. The first pull-down menu is either blank or has the value Not. The second pull-down menu has a list of all the existing preconditions in your character, both built-in and custom. Select one of them for your line of dialog. For example, if the line of dialog uses the user's name, the precondition Know_UserName would be appropriate.

[0209] You can also use preconditions to keep characters from repeating certain dialog like stories or jokes. If a joke about a fish is already set to trigger a precondition Told_FishJoke once it is told, setting the Precondition options on telling that particular joke to Not Told_FishJoke means it would only tell that joke if it had never told that joke before.

[0210] Each line of dialog has an Action Type, which lets the ImpEngine know how to make the character behave

when each line is said. In the pull-down menu, you will see ten Action Types that can apply to a line of dialog.

[0211] A Fact is a statement the character says to the user. It requires no immediate answer or elaboration. The Imp Character will pause for a moment after saying a fact, and then move on to whatever it was going to say next.

[0212] The Action Type Yes/No Question tells the character to pause and look for either a Yes or No answer to that line of dialog, and follow up with an appropriate response for each. When you select Yes/No Question, new entries appear in the tree so you can fill in what the character should say when the user answers "Yes," as well what it should say when the user answers "No."

[0213] A Question is similar to a Fact, but after a Question the Imp Character will pause while it waits for the user's open-ended answer to the question. You should write keywords that permit the character to understand the likely responses to this question.

[0214] When a line of dialog is a Question w/Followup, the character poses the question, waits for a user response, then makes a followup comment. The followup comment is the same no matter what the user utterance "means." For example:

[0215] Character: Yes, I love Los Angeles. How do you feel about L.A.?

[0216] User: Los Angeles is great.

[0217] Character: Everyone's entitled to their opinion.

[0218] The character will say the same followup comment no matter what the user says—be it "L.A. is great" or "I don't like it" or "I'm not telling you," etc. In this case, the followup comment makes sense for all those replies—but this is not always the case with this type of dialog. Since the character will say the same thing no matter what the user says, author a fairly vague response. Obviously, you run the risk that the user will say something completely unrelated after the question and the followup will make no sense. You should use this action type extremely sparingly and try to make the questions extremely attractive ones. Most of the time, a character can get by with a plain Question in hopes that the user's response will match a keyword.

[0219] A Story is technically a series of linked Facts that the Imp Character speaks one after the other. After saying the first part of the story, it will give the user a few seconds to finish reading that fact, then move on to the next part of the story. When you select Story, a new heading called Next Step In Story will appear under that line of dialog in the tree, and a Delay box will appear in the work pane. Expand the Next Step in Story heading and enter some new dialog there as well. You can add as many steps to a story as you want, however, be aware that few users will get deep enough in your character to see more than three or four steps. Users can interrupt a character's story to ask questions or make statements. The character will attempt to return to the story the first and second time it is interrupted, then abandon the story if it is interrupted again.

[0220] When you select Story, a text box labeled Delay will appear below the Action Type box. The number you enter in this box is the minimum number of "ticks" (usually, ticks are seconds) that the character will wait when the behavior is completed before moving to the next item. For the LiveComics or Flash character, the behavior is generally instantaneously "complete," as the words simply appear in the text box. For the MSAgent character, the behavior is not complete until the text-to-speech engine finishes saying the line. Adjust this number until the character is saying the line and continuing to the next one at the correct pace.

[0221] Selecting Shared as an Action Type makes a new pull-down menu appear underneath the Action Type box. This new menu contains the short names for the shared dialogs you have already created. From the menu, you can select one of your shared dialogs to be used here. If something is already entered into the text box, it will be deleted and replaced with the (shared dialog: DialogName) notation.

[0222] The remaining Action Types in the pull-down menu are only active in the Web Guide Role (discussed below).

[0223] To associate a gesture with a line of dialog, select the gesture from the pull-down menu. If you would like this line of dialog to be accompanied by a custom gesture that has not yet been added (is not in the menu), add the gesture in the top level of your character first. If you select a gesture that is not the default gesture, you have the option of setting Gesture Parameters for that gesture. Gesture Parameters provide extra instructions for the character and are particular to the different body types. Some examples of Gesture Parameters are MSAgent_X and MSAgent_Y, which instruct an MSAgent character to move to certain X or Y coordinates on the screen; and ImpTalk_URL, which instructs a StraightTalk character to open the URL you specify when it performs this "gesture."

[0224] To add a Log Cue to a line of dialog, enter the names of log cues in the top level of the Editor, then select one of your log cues from this pull-down menu. Each time the character uses the line of dialog, it will be "tagged" with a log cue in the raw log. Later, you can use the Log Analyzer to analyze the logs and calculate various statistics related to log cues.

[0225] Imp Characters can understand pronouns in context if you bind them properly using this feature. In natural conversation, humans use pronouns to refer to things that have already been named. Pronoun binding allows characters to converse more naturally. If Izzy were to say "I do enjoy a bit of catnip frenzy from time to time," the user could have any number of responses containing pronouns. For example, the user might say, "Why do you like it so much?" or "What happens when you do that?" or "I want to buy some." Using Pronoun Binding, you can ensure that the character will understand each of these inputs.

[0226] At runtime, when the character says this line of dialog, the ImpEngine loads the binding information and will automatically look for any matching pronouns in the responding user utterance. The ImpEngine will substitute the bound keyword(s) for the selected pronoun(s), and then finally run the user input through the NLU. The character will "understand" that the user said the bound word.

[0227] Recall that the Multiple Dialog Screen (**FIG. 15**) is the screen that shows all the possible lines of dialog for a particular keyword-question stem combination. Here are the

features of the Multiple Dialog Screen, which should be familiar after you have some experience with the Single Dialog Screen. The Multiple Dialog Screen shows all of the lines of dialog that pertain to a particular keyword-question stem combination or heading, not just single lines by themselves.

[0228] The Create Precondition button creates a precondition based on the selected dialog (same as before).

[0229] The After-Dialog Keywords button creates a new Keywords level in the tree attached to the keyword-question stem combination you entered. Any keywords you enter here are referred to as After-Dialog Keywords because they are only active immediately after the character speaks any of the lines of dialog pertaining to this particular keyword pattern, then are made inactive again after the next utterance.

[0230] After-dialog keywords are useful for trapping general keywords that occur at specific points in the interaction. In the above example, you can imagine that the single word "why" would not be very useful as a general keyword. However, if the user said "why" immediately after this line of dialog, you could assume that the user was asking why Izzy likes catnip so much. After entering these keywords, you can write specific dialog for them.

[0231] You can also use after-dialog keywords to respond to "Yes" or "No" in cases where an explicit Yes/No Question would be unwarranted (for example, when the character makes a rhetorical question—because inevitably, someone will answer).

[0232] Use the Change Mood pull-down menus to alter your character's mood when it comes to this section of the dialog. Think about how this topic of conversation makes your character feel. If the topic is a fond one, it might make the character Slightly More Happy when it says the dialog. If the topic is sad, it might make the character A Lot More Depressed. Use your judgment. **FIG. 19** illustrates a screen for entering how the agent's mood should change in the context of specific keywords input by the user.

[0233] It is not possible to have one line of dialog responding to a particular keyword pattern make the character Slightly More Happy and another under the same pattern make the character A Lot More Furious. Think about mood on a per-topic, not per-line, basis. No matter which line it picks to say, the topic should have the same effect.

[0234] Some lines of dialog, like those in the Backstory chat topic, have default Change Mood options. For example, Insults automatically make the character More Angry. You can adjust them if you so desire. You can also enter arbitrary percentages in the percentage box.

[0235] Use the Gesture pull-down menu to set a gesture that will be associated with every line of dialog in the Multiple Dialog screen. This menu is really a shortcut to assigning gestures, as you might not want to give every line under this particular keyword the same gesture. Use the Single Dialog screen(s) if you want to give each line of dialog a different gesture.

[0236] Select a Log Cue from this pulldown menu to apply it to all of the lines of dialog for this particular keyword-question stem combination. Again, this is a shortcut to assigning log cues, as sometimes you may want certain lines of dialog within the same dialog area to have a different log cue.

[0237] The first pull-down menu atop every line of dialog is the dialog's Action Type. It functions the same way as it does in the Single Dialog screen. The next two pull-down menus are the Use When Mood menus. They function the same way as they do in the Single Dialog screen. The last two pull-down menus are the Precondition menus. They function the same way as they do in the Single Dialog screen.

[0238] As token groups lend variability in keywords, word groups lend variability in dialog. Word groups can be included in lines of dialog as you are authoring. Then, entries in a word group can be selected at random at runtime so that your character never says the same line quite the same way. Word groups, like token groups, begin with the # character. Several word groups are built-in but must be filled in with words specific to your character.

[0239] **FIG. 20** illustrates how to make entries into a word group. One of the built-in word groups is #User, which stands for the ways the character names the user. Within the word group #User, one entry is built-in: $Cap_String=UserName( ), which stands for the user's actual name (if they had entered it at the beginning of the interaction when the software asked for it). In the blank box, you can begin entering specific words that the character can use to refer to the user, like "my friend,""buddy,""my pal," etc. When you write the line of dialog "How are you, #User," the character might say any of these lines at runtime: "How are you, Mike,""How are you, my friend,""How are you, buddy," or "How are you, my pal?"

[0240] You can make as many word groups as you want and use them in dialog. For example, you might create a word group #Animals to make the sentence "I really like #Animals" different every time. Keep in mind, however, that your character will have no idea what animal the ImpEngine picked, so if the randomly selected animal produced the sentence "I really like camels," and the user says, "I love camels!" if "camel" is not already a keyword the character will not comprehend.

[0241] Entries in word groups, like lines of dialog, each have options for Use When Mood, Precondition, Weight, Order, and Pronoun Binding. Use these in the same way you use them when authoring complete lines of dialog. Obviously, you do not want your character to call the user "my friend" if the user has just spent twenty minutes insulting the character; you would set Use When Mood to avoid this situation.

[0242] You may have noticed that there are many ways a dialog's properties may affect when it is used, some of which do not seem exclusive of each other. If the ImpEngine finds more than one line of dialog that is available to match a particular user utterance, the ImpEngine selects the final dialog according to the following algorithm. The ImpEngine looks at all of the possible dialog options, and passes them by a set of five criteria. The criteria themselves are:

[0243] Order

[0244] The ImpEngine looks at the order field associated with each piece of dialog and compares it with the order it wants (if it had previously said something in this set of dialog with Order=1, it will look for something with Order=2). If the order matches, the line of dialog meets this criterion.

[0245] Non-Repeating

[0246] The character keeps track of dialog entries it has used before. If the dialog entry has not been used before, the line of dialog meets this criterion.

[0247] Mood

[0248] The ImpEngine looks at the mood associated with the dialog and compares it to the mood of the character. If the character is in the mood, the line of dialog meets this criterion.

[0249] Preconditions

[0250] If any precondition is attached to the line of dialog, it is compared with the preconditions that may have been triggered during the interaction. If the precondition requirement matches, the line of dialog meets this criterion.

[0251] Closest Order

[0252] The ImpEngine looks at all of the available lines of dialog and determines which one has the largest Order value. If the desired order value is not available, it uses Closest Order to evaluate the dialog. For example, if the ImpEngine has already said something with Order=2 it would ordinarily look for Order=3, but say it sees that all the lines of dialog in a particular case are either Order=1 or Order=2. Since it determined that the largest Order value in this group of dialog is 2, it will designate lines with Order=2 as lines that meet the Closest Order criterion.

[0253] Using these criteria, the ImpEngine groups the available lines of dialog into seven sets. A line may not be included in a set unless it meets all of that set's criteria.

[0254] Set 1 contains lines that meet Order, Non-Repeating, Moods, and Preconditions

[0255] Set 2 contains lines that meet Order, Moods, and Preconditions

[0256] Set 3 contains lines that meet Closest Order, Non-Repeating, Moods, and Preconditions

[0257] Set 4 contains lines that meet Closest Order, Moods, and Preconditions

[0258] Set 5 contains lines that meet Non-Repeating, Moods, and Preconditions

[0259] Set 6 contains lines that meet Moods and Preconditions

[0260] Set 7 contains lines that meet Preconditions The sets are then searched in order (1 to 7), and the final dialog is chosen randomly from the first set that isn't empty.

[0261] Roles and Applications

[0262] A character is defined by its mood dimensions, moods, and backstory. When a character is ready to meet the public, a character should also play a Role. A role is a bundle of abilities designed for a specific task. By enabling a role for a character, you give the character access to that role's abilities, and can create Applications for the role. While moods or backstory are constantly available to the character, a character can easily change, add, or swap around its roles and applications, so you can easily develop multiple roles for the same character and produce different versions of the character for different sites or purposes.

[0263] The Editor currently gives you access to three standard roles, shown in the left pane of FIG. 21. Each role contains a set of likely categories of user input your character will probably encounter while it is playing each role. The Chat Only Role is the default role that extends your character with new keywords and dialog. The Web Guide Role enables characters to act as website tour guides. The MultiChat Role enables a character to respond to questions but not carry on ongoing conversations. You can create your character in any role, but at least one role is necessary to run your character on a website. Other examples of roles include sales assistant, learning guide, customer service agent, messenger, survey administrator, website host, game opponent, and marketing agent.

[0264] By default, every new character is playing the Chat Only Role. This is the basic role that the other, more complex, roles are derived from. Characters playing the Chat Only Role can converse with users, but have no other specific tasks to perform. The Chat button on the Chat Only Role screen lets you test your character in this role after you configure it. The Retest button on the Chat Only Role screen lets you test your character without reconfiguring it (it will launch an interaction without taking into account any changes you made since the last time you configured it). Keywords in the Chat Only Role are just the same as in the Backstory Chat Topic or the other chat topics. You should author content here that only applies in this role and not in the others. If your character is hanging around the water cooler, for example, it might be willing to chat about things it wouldn't discuss while he was working.

[0265] Noncomps (short for "non-comprehended dialog") are things the user says that the character doesn't understand. This means that it hasn't been able to match what the user said to any of its keywords or token groups. The Chat Only Role has a special section for writing the things the character will say in response when it registers a noncomp. Creating noncomp responses is just like creating ordinary dialog. You may provide a set of noncomps, each with its own conditions, including the moods for which it is appropriate, its weight or order in the list of noncomps, or its action type. Although noncomps function just like any other dialog, they have a special importance when you're designing your character. Since no character understands natural language perfectly, there will be many occasions on which the character has to respond to a user with a noncomp. To keep the character from sounding repetitive, it's important that you design a wide range of believable noncomps. A character that says only, "I don't understand" will quickly seem lifeless and unintelligent.

[0266] Your character should be deferential but not simpering when it doesn't understand. The character should ask the user to rephrase, not to repeat or say it louder. If the user repeats himself in the exact same words, the character still won't understand; "say it louder" is a cop-out since your character has no sense of hearing. The character should never blame the user for a noncomp (e.g. by suggesting that the user might have misspelled something) because most of the time, it actually is the character's "fault." Noncomp responses such as "I didn't get that, could you rephrase?" or "I'm sorry that I'm not understanding you—could you say that differently?" are your best bet.

[0267] Notice that noncomps are a property of a particular role, so each role you build for a particular character will

need its own noncomps. You can easily share them among roles by using Shared Dialog, of course. However, you may want to craft different noncomp responses for each chat topic so that a chatty character's noncomps may be friendly, for example, "Wow, I didn't understand that at all! Mind rephrasing?" while the same character in a working role may be more formal: "I don't believe that's something I am familiar with. Can you rephrase?"

[0268] Enter the ways the character will respond to the user saying goodbye. When the user says goodbye, the character will say a line of dialog from here and close the interaction.

[0269] The MultiChat Role is for carrying out noncontinuous interactions with many users. This means that every new utterance is treated as the "first" utterance, and receives a single utterance in return. Since there is no ongoing thread of interaction, a character in the MultiChat role will not have moods, cannot tell stories, and cannot remember the user from one utterance to another. The MultiChat role is most useful for simple FAQ-answering applications and not for applications where conversation continuity or user modeling is essential. The MultiChat role has two sections, Keywords and NonComps. These sections function the same way as in the other roles.

[0270] A character playing a Web Guide Role gives tours of websites, or can be adapted to perform a variety of proactive tasks. You can provide it with a Web Guide Application containing an itinerary of Web pages to visit, and it will go from page to page, presenting new dialog on each page, and answering questions about what it's showing to the user. For the web guide application to function correctly, you need to fill in the dialog in the Web Guide Role section, which is dialog for responding to a collection of inputs a character might encounter while it is giving a tour. This role is appropriate for web-based characters that need to move around on the web, such as teachers, advertisers, or tour guides.

[0271] This role is similar to the Chat Only Role, but has some additional content. It has predefined categories of dialog that might reasonably come up during a tour. For example, a user might comment on liking or disliking the tour, might ask to go back to a previous page, or might want to end the tour. By writing dialog for these existing categories you guarantee your character can handle the basic mechanics of being a web guide.

[0272] The role section does not contain the details of a specific tour. The role has the general behaviors your character will use on any tour it might give. Once you've authored the role, you then create a very specific Web Guide Application (see below), which specifies the itinerary and other details about that particular tour. Remember to keep your character's dialog in the Web Guide Role fairly general, since it might be used in many different tours.

[0273] Here are the categories of dialog in the Web Guide Role, along with a brief explanation of what each category is used for. In most cases there are more detailed lists of specific utterances within each category (so the Help category, for example, contains questions like "How long is the tour?").

Dialog Category	Description
Keywords	Just as in the Chat Only Role, you can add your own keywords and dialog in this section. It starts out empty
	Responses to User Questions
Help	Help covers basic user questions, including "How long is the tour? " "Where are we going? " "What can you do? " and a generic help response when we know the user is asking for assistance but can't narrow it down further.
Application Feedback	Replies to user comments about liking or disliking the tour.
Other	Replies to greetings and navigational requests. Notice that the "Let's go back" request actually moves the tour back to the previous stop (see Action Types below).
	Web Guide Comments
Stop Navigation	This category contains the character's dialog for moving from stop to stop in the tour. This is where it asks "Are you ready to move on? " tells you "This is the last stop," and so forth. Notice that the "Are you ready to move on? " question actually does move the tour to the next stop if the user answers "yes" (see Action Types below)
NonComps	Various utterances used when the character doesn't understand what the user has typed (discussed above).
Sleeping & User Inactivity	Dialog the character speaks when it goes into sleep mode or wakes up during a tour. You set the values for how patient or sleepy the guide is when you create a specific Web Guide Application (see below); all you do here is provide the dialog it will use.

[0274] As you will remember from above, each piece of dialog in the Editor has an associated action type, such as Fact or Question w/Followup. Characters that use the Web Guide Role can make use of several new action types in their dialog in addition to the basic set. They are:

[0275] Email

[0276] This action type allows the character to electronically mail a message to the user. You should have two kinds of dialog for every time you want to send email: one that has a precondition KnowUserEmail, and another that has the precondition Not KnowUserEmail. Both lines will have the Action Type of Email.

[0277] In the KnowUserEmail case, your line of dialog should say that the character is going to send some email, whereupon the character will automatically send the email and say the Sent Email Response (usually something like, "I hope you enjoy it!"). In the Not KnowUserEmail case, the line of dialog should ask for the user's email address. If the ImpEngine recognizes the immediate answer as an email address, the character will automatically send the email and say the Sent Email Response.

[0278] Ideally, you should ask the user's permission before sending them email by setting up a system of dialog with preconditions. The first line of dialog, a Yes/No Question, should ask for permission to send a message; two different Yes answers, with action type Email, should proceed as above, while the No answer should apologize for the intrusion (many people today are wary about computers "collecting" their email addresses).

[0279] The message sent contains the contents of a text file, which must be created and its location specified in

advance. The file should be placed on the character's server in that location. So that the ImpEngine can send the text file as an email, the text file should contain: one line with the character's email address, the next line for the subject of the email, followed by the message content. Here is a sample:

[0280] izzy@extempo.com

[0281] Subject: My favorite cat names

[0282] Here are a few of my favorite names:

[0283] Dizzy

[0284] Ezri

[0285] Fuzzy

[0286] And naturally, Izzy!

[0287] Hope these help.

[0288] Izzy Of course, use your character's "real" email address (and make sure that address exists at your company in case people reply!) and give a relevant subject line.

[0289] Sleep

[0290] This action puts the character to sleep; it will passively wait for input from the user before waking up. While asleep it will not speak or act. This is useful when you expect the user to take some time looking at a Web page, and don't want your character to keep prompting the user to move on.

[0291] Go To Stop

[0292] **FIG. 21** illustrates a screen for selecting a particular stop on the tour. With this action your character will go to a particular stop on the tour that you specify. This function enables your character to jump from stop to stop without having to follow the itinerary. If, for example, Izzy were giving a tour of his house and the user said "Take me to the kitchen," Izzy could go to the kitchen page directly. When you select the Action Type Go To Stop, a new entry in the tree appears, entitled Go To Stop. Selecting it reveals the screen where you select which stop the character should go to.

[0293] Return

[0294] Return takes the user back to the previous stop on the tour itinerary, and continue where it left off on that stop's agenda. When this action type is used, the character goes back to the previous stop, but cannot do so to backtrack through an entire tour—the character always takes the user back to the immediately "previous" stop. If you went from A to B to C, then triggered a Return while on stop C, the character would go to stop B. If you subsequently triggered another Return, the character would "return" to stop C because that was its most "recent" stop.

[0295] Goto Next Stop

[0296] This moves forward to the next stop on the tour itinerary.

[0297] Say Bye and Exit

[0298] This action stops the tour and shuts the character down. There will be no further actions after this one, so make certain that the character says goodbye and makes it clear that the tour is over.

[0299] These action types should only be used within the Web Guide Role. Nothing about the Editor prevents you from using them in the other topics, but they won't work if your character isn't performing a web guide application when they come up.

[0300] Use these action types if you want to break out of the linearity of the itinerary. The web guide itinerary itself handles all the basic tour navigation for moving forward from stop to stop, moving back at user request, and ending the tour; you just create specific utterances for the existing dialog categories. Use these action types if you want more fine-grained control in response to specific user commands.

[0301] The Web Guide role broadly describes how a character behaves when it is giving a tour—any tour, be it an astronomy site, movie reviews, or a pet shop. The Web Guide Application contains the tour itself. The web guide application defines the stops on the tour, the keywords the character knows about while it is giving that particular tour, how fast the tour moves, and so on. You may have many web guide applications in a single character, but the character can only use one application at a time, so it's best to split up applications amongst different copies of the Imp Character (see details below).

[0302] **FIG. 22** illustrates creating a new Web Guide Application. To describe the details of a particular tour (of an astronomy site, say), you create a Web Guide Application by clicking on the Web Guide Role heading and clicking on the New Web Guide Application button on the right side of the Character Editor, or you can select that option from the File menu. When the dialog box appears, name your web guide application something descriptive. You can also import an existing web guide application from another character by clicking the Import Web Guide Application button on the Web Guide Role screen (useful if you want two characters to give roughly the same tour). When you create a Web Guide Application, you see the following options:

[0303] The names of all authored stops are listed in the First Stop menu. Select one of them to make it the default First Stop, which is the stop where the tour "begins." If you configure the character to use this Web Guide Application, clicking Test will let you test it.

[0304] Expanding the Web Guide App heading reveals some new headings. Here is a description of those fields.

[0305] The Application Parameters of a Web Guide Application control the flow of the interaction—how quickly it moves and how patient the character is on each page. You are free to change these values. The Application Parameters are as follows:

Parameter	Default	Description
Ask If Ready Repeat Time	60	At the end of a stop, the character asks a user if he/she is ready to move If the user does not reply or answers "no," this is how many seconds the character will wait before asking again.
Fidget Interval	10	How many seconds the character will wait for the user to respond to a direct question before it will begin to idle.
Initiation Patience	5	The time in seconds the Web Guide must be idle before performing the next step in the current stop's agenda.

-continued

Parameter	Default	Description
Patience	90	How many seconds the Web Guide will wait for the user to respond to a direct question before giving up and falling asleep.
Speed	10	The time in seconds the Web Guide will wait before going on to the next item on the current stop's agenda.
URL Load Delay	5	The time in seconds the Web Guide will wait after directing the browser to a new URL before beginning the agenda for the stop.

[0306] Authoring application parameters takes some practice. It's difficult to tell in advance how long you want your character to wait, or how fidgety you want it to be. Often it's simply necessary to run through the tour to adjust these values until they "feel" right.

[0307] Keywords function the same here as they do in the other sections. Keywords entered in the Web Guide application will only be active when the Web Guide application is active.

[0308] Farewell Comments are dialog your character speaks when the tour is ending. It can be "So long, come back again soon!" or any other dialog.

[0309] The Exit Side Effect dialog occurs when the session ends. The character will generate the dialog, but not actually speak it. You might want to use this slot to set a variable, access an external data source, or perform any other tasks that need to be performed when the session ends.

[0310] The Itinerary is the heart of a Web Guide Application. This is where you spell out where the character will take the user and how its actions and knowledge should differ from page to page. An itinerary consists of a group of Stops, usually web pages. Each stop has an Agenda of one or more Steps of dialog the character says. It goes through the agenda in order, saying something for each Step before moving on to the next Stop.

[0311] There are a variety of ways you can put content into the Web Guide Application. You can simply divide your application into logical sections, which will become stops in the Web Guide itinerary, or you can make divisions based on points when you want your Imp Character to display a different Web page, creating a new stop for each Web page.

[0312] Begin by clicking in the Stop Name field where it says First Stop. Replace First Stop with a descriptive name of the first stop of your application. Fill in the names of the other stops in your application. The program will automatically number your entries and bring up additional lines as necessary.

[0313] You use the Next Stop fields to tell your Imp Character which stop follows which. In the Next Stop field to the right of your first stop name, use the pull-down menu to select the name of the stop you want to follow your first stop, unless, of course, you don't want the character to automatically move onto the next stop. Designate next stops for all stops, as appropriate. By default, once a tour has begun, the tour guide character will go through the stops in order, as long as you make sure to always specify a Next Stop. At each stop it will go through the agenda steps in order. The properties of a stop are:

[0314] Stop

[0315] When you create a stop, you give it a name, a URL (the Web address you want the character to visit, if any), and the name of the stop to go to when this one is completed. You may also turn certain prompting questions (such as "Are you ready to go on?") on or off at each stop. Here are the descriptions of those questions.

[0316] Can the User say "Next" to move to the next page?

[0317] If this box is checked, the user may say "Next" to move to the next page and not wait for the character to prompt him.

[0318] Override the default "Let's Go On" comment when User says Next?

[0319] If this box is checked, the Editor will provide you with another heading under this Stop where you can enter special dialog for this stop's "Let's Go On" comment. For example, you might want to make a specific stop have a specific "Let's go on" comment, like "This next page has some great pictures of Mars. Let's go check them out."

[0320] Should the character ask the "Ready to Move On" Question at the end of the Agenda?

[0321] If this box is checked, the character will ask the user if they are ready to move on before going to the next page. If this box is not checked, the tour will stop short at the end of this stop's agenda and will not continue anywhere else, even if the user says "Next."

[0322] Override the default "Ready to Move On" Question?

[0323] If this box is checked, the Editor will provide you with another heading under this Stop where you can enter special dialog for this stop's "Ready to Move On" question. For example, you might want to make a specific stop have a specific "next page" question, like "This next page has some great pictures of Mars. Wanna check 'em out?"

[0324] Test

[0325] Click this button to test your character beginning at this stop. Using this function lets you test individual stops instead of wading through an entire complicated itinerary each time you want to check something.

[0326] Keywords

[0327] These are keywords specific to this stop only. Be sure to create dialog for your application's "Farewell Comment," which can be found under your Web Guide application name label, and for any built-in NLU for the Web Guide Role that you want your character to respond to.

[0328] Stop Overview

[0329] This is a collection of possible user inputs that the character should respond to in a specific way for every stop.

[0330] Stop Agenda

[0331] Click on this button to add steps to the Stop Agenda. New Step entries will appear in the tree. Step items can include pieces of dialog and action types. Click on the entries to begin adding dialog. Authoring dialog for a Step is just like authoring dialog for ordinary keywords. Click on the Step **0** label to bring up the Step **0** dialog screen where you can enter dialog.

[0332] You may control the order in which steps are visited or the delay between individual steps by clicking on the main Stop Agenda heading. If you want your character to move automatically to the next stop, it's a good idea to include a blank agenda item with the action type GoTo Next Stop (WebGuide). This tells the character to move on to the stop you designated as next. Adding a blank stop permits you to control the timing of the character more precisely than if you simply make the last piece of dialog in a stop into a GoTo Next Stop (WebGuide) action type.

[0333] When you configure a character in a particular role, you can test the character's interaction in that role from within the Editor. Once your dialog has all been entered into your Web Guide application, you will want to test the application so you can adjust the timing and correct any mistakes. After configuring for the Web Guide Role, you can test the application by clicking on the name label for your Web Guide application and pressing the Test button. Make adjustments to the application parameters and stop agenda screens as appropriate.

[0334] To test a character in the Chat Only Role, configure it first. Then go to the heading Chat Only Role and click the Test button in the work pane. A console window will compile the character for launch and then a chat window will appear, with your character and yourself ("guest") as participants. You can interact with the character here by typing into the text box. Your character behaves here the same way it will function on a website, except its behavior with regards to timing is not precisely the same, it will always perceive you as a new (not return) visitor, and some preconditions may not function since there may not be an available database to store them.

[0335] To test a character that has a Web Guide Application, configure it first. Then go to the heading Web Guide Application (not the Web Guide Role heading) for the particular application that you wish to test and click Test in the work pane. The same generic chat window will appear and the character will begin its agenda.

[0336] The Web Guide Role is adaptable to purposes other than leading tours of pages on websites. You can use the Web Guide Role to make your chatty character proactive, that is to say, they will be able to actively bring up topics for conversation instead of passively sitting around waiting for the user to say something that matches their keywords (as it would in the plain Chat Only role).

[0337] You can accomplish this by creating an itinerary containing one stop that doesn't include a URLs, but whose steps contain topics of conversation you want the character to progress through. For example, Step 1 could be "What's your name?" Step 2 could be "What's your favorite color?" and Step 3 could be "Do you like Monty Python movies?" The character will try to move to all of these steps, that is to say, to ask these questions during the interaction, but will also allow itself to get sidetracked if the user engages it in conversation. Add enough steps to keep things fresh. The last "step" on the agenda could cycle through random topics of conversation endlessly until the user got bored and left. (Shared dialog from Backstory is extremely well-suited to this purpose.)

[0338] The basic Imp file for a character should be called CharacterName.IMP (for example, Merlin.Imp). This basic file, called the persona, includes the character's mood system, backstory, token groups, word groups, shared dialog, preconditions, and any keyword sets you might want to share.

[0339] When naming the web guide application, you don't need to include the character's name in the name of the application. Try to be specific about the name, so that reading the name of the application will be enough to know exactly what the application is for, i.e. ExtempoTour, ChatterBot, FinanceDemo.

[0340] When you create a new web guide application, you should create a new copy of the Imp file that includes the name of the character and the name of the application in the style CharacterName_ApplicationName.IMP. For example, Merlin might have three applications, and so there should be three extra IMP files: Merlin_ExtempoTour.IMP, Merlin_ChatterBot.IMP, and Merlin_FinanceDemo.IMP. Do your work on each web guide application in the appropriate Imp file, but do your work on global content (like Backstory) and global properties (like the mood system) in the basic Merlin.IMP file. Then, use Update Character to copy your changes from the Persona file to the three Application files.

[0341] There are several advantages to splitting the character's applications up in this way.

[0342] 1. It keeps a "clean" version of the character that can be used as a starting point for new applications.

[0343] 2. It keeps the content for different applications separate.

[0344] 3. It allows content development on the character's Persona and various applications to proceed in parallel, even with different writers working on the various pieces. The application-specific files can be updated with any changes in the Persona using the Update . . . function in the Editor.

[0345] 4. It allows you to update basic content in the main Persona file, then update it to each of the application files instead of requiring you to author it four times.

[0346] Physical Representations

[0347] Physical representations of your character make it come alive. The Bodies section of the Editor contains the mechanisms for configuring art to function with your character. Presently, there are two different "bodies" that a character can have: LiveComics and Microsoft Agent. New body types may be added in the future, using Flash, Pulse, or other technologies. Extempo's authoring software allows you to use the same content for any body type.

[0348] LiveComics is a Java-based client that uses two-dimensional .JPEG and .GIF images of the character in

conjunction with a text box or balloon. It functions much like a text-only chat room where the participants are your character and one user.

[0349] Microsoft Agent is the three-dimensional character client that allows the character to drift above all windows, which seems to give it more presence and power. This client allows the character to speak aloud.

[0350] Flash is a streaming animation technology that Extempo technology can now interface with. Users must download the Flash plugin to see a Flash character.

[0351] Inductive Authoring

[0352] Inductive Authoring is a way of checking a single word or a word in a keyword pattern you are writing against the built-in token groups. Recall that token groups are groups of related words that are useful for expanding keywords to cover more possible input. It is entirely possible that while you are writing a keyword, you might not know that a word you entered is part of a larger token group. Replacing the word with its token group would increase your keyword coverage.

[0353] For example, inductively authoring the keyword I want a cat might result in the new keyword #I #want a #cat. This would allow the character to respond to a greater range of inputs, like "I need a cat" or "me want a kitty," that all mean the same thing. Inductive Authoring also allows you to examine the words that are built into predefined or new token groups.

[0354] In order for Inductive Authoring to function, a character's knowledge must have been configured on the local machine at least once. If the character has been configured before, you may load the knowledge directly by selecting Inductive Authoring Properties from the Tools menu and clicking the Load Knowledge button. It is a good idea to reconfigure the knowledge whenever new token groups are added so that they get integrated into Inductive Authoring. Knowledge that has been loaded into Inductive Authoring is reset whenever a different character is loaded into the ICE.

[0355] Once the appropriate knowledge has been loaded and Inductive Authoring has been enabled, Inductive Authoring may be used to generalize any keywords or examine any token group. In the work pane, go to the keyword you wish to process and go to the View menu. You will see two Inductive Authoring options in the menu. Selecting Inductive Authoring: View Alternative Patterns . . . from this menu will process the keyword. If any parts of the

[0356] keyword can be replaced with token groups, a dialog box will appear with alternative selections for keywords. If the keyword or highlighted text consists of a single, existing token group like #cat, you may use Inductive Authoring to Display Token Group Entries. This is useful for uncovering the contents of built-in token groups, or reminding yourself what you authored into new ones.

[0357] The advantage to Inductive Authoring is that you can simply write your keywords as they make sense to you, then run them through Inductive Authoring to optimize them for user utterances you might not have anticipated. Inductive Authoring works best for expanding the coverage of phrases, rather than standalone, single-word keywords. Typically, one-word keywords are very specific to particular situations and should not be generalized.

[0358] Storing User Responses

[0359] The Imp Character Editor uses a number of commands that can capture what a user says and remember this information across repeat visits by storing the data in a database. In addition, the character can repeat back what he or she knows about the user. This is accomplished through Expressions that can be used in keywords and dialog. Here are two relevant expressions to this task.

[0360] For capturing data, use this expression in a keyword

[0361] $StringAttribute(variable_name)<#tokenGroup

[0362] For reading back data, use this expression in dialog

[0363] $String=UserAttribute("variable_name")

[0364] When you use this feature, you specify a variable name that denotes the captured data. The variable name needs to be one word with no spaces, although some special characters like "_" are allowed. The variable should be descriptive. For instance, if you use the code to remember where the user lives, you may decide to call your variable User_Hometown.

[0365] To store data, insert the "capture" Expression into a keyword. As an illustration, consider how the keyword pattern I #reside in could be modified to remember where the user lives. Before using code, if a user were to say "I live in Omaha," the first three words would match the keyword pattern, and the character might respond "I hear that's a beautiful place to live!" As you can see, the character merely makes this pithy generic remark because it doesn't truly understand that Omaha is a city.

[0366] Now consider if the keyword were changed to I #reside in #AmericanCities. The token group makes the keyword more specific. The user can say "I live in Omaha" (assuming Omaha is in the token group #AmericanCities) and the character would understand that it is in fact an American city.

[0367] Now that a token group has been added to the keyword pattern, the data capture code can be inserted. This would make the keyword

[0368] I #reside in $StringAttribute(User_Hometown)<-#AmericanCities (The <- notation stands for an arrow.) The token group #AmericanCities "points" to the variable User_Hometown, meaning that for something to be stored as User_Hometown, it must be found in #AmericanCities, or the keyword won't match. Thus, if a user were to say "I live in Omaha," the keyword would not only recognize this pattern, but also store "Omaha" in the variable User_Hometown. This data can then be permanently saved in a database or used in dialog.

[0369] Using a token group to specify what kind of data should be saved is a necessary step. However, there are a number of instances where an author may need to capture some data that has no associated token group. For example, you may want to remember the user's last name, but clearly there is no token group that contains every possible surname

in the world. To do this, you must use a special class of token groups. This class consists of:

[0370] #miscAnyOneWord

[0371] #miscAnyTwoWords

[0372] #miscAnyNumberOfWords

[0373] These token groups "contain" any and all words. Thus, to remember somebody's last name, you could author a keyword like

[0374] last name is $StringAttribute(LastName)<-#miscAnyOneWord This would match "My last name is Smith", "My family's last name is Wong", and more. Whatever one word comes after "is" in the keyword will be caught by #miscAnyOneWord, and will then be saved in LastName. Of course, tricky users can defeat the purpose by saying "My last name is Idiot," so you may want to think twice about having your character later speak what it has stored in #miscAnyOneWord. The important thing is to store the data, not show off its ability to parrot the data back.

[0375] Make sure your keywords are designed well enough that the #miscAnyOneWord will not catch extraneous information. Consider the above example of remembering the user's hometown. By replacing the token group #AmericanCities with #miscAnyOneWord, the character will not be limited in the kind of responses it can catch. The new keyword would look like this:

[0376] I #reside in $StringAttribute(User—Hometown)<-#miscAnyOneWord

[0377] However, this can cause some problems. If a user were to say "I live in Los Angeles", only the word "Los" would be saved. One solution to this is to make several keywords of differing importances: one that remembers one-word answers and another that remembers two-word answers (the two-word pattern should be more important than the one word pattern). The best way to find out what patterns work best is through trial-and-error. Therefore, it's always best to test your character a number of times to see how it responds in real-world scenarios.

[0378] When a character remembers a piece of data, it is automatically stored in a "User Profile" database. As an author, you can "peek" into this database and repeat back some of the information the character has learned. This is done with the UserAttribute command. Suppose you wrote a keyword that remembers where a user lives. Such a keyword could look like:

[0379] I #reside in . . . $StringAttribute(User_Hometown)<-#AmericanCities

[0380] If the user response matches the keyword as above, the hometown will be saved as the variable User_Hometown. To have the character repeat this information, a followup response could be written as:

[0381] Character: I've heard good things about

[0382] $String=UserAttribute("User_Hometown").

[0383] (Note that the variable is enclosed in quotation marks as well as in parentheses. This is a requirement of the UserAttribute command.)

[0384] The UserAttribute command simply looks for the specified variable in the database, and inserts the value that it is associated with into the dialog. If there is no value associated with the variable, there will simply be a blank space in the dialog, which would look like this: "I've heard good things about ." For this reason, use preconditions to track whether your character has learned where the user lives (or anything else your character might need to know) before you have it try to say lines that include stored user information. If the character hasn't learned the information, it should offer a different line of dialog.

[0385] It should be apparent from the above description that a wide variety of potential contexts are within the scope of the invention. Potential contexts include any type of user input during operation of the agent, internal events or states of the agent, and input from a different computer-controlled process. A user input may communicate a message or user gesture (e.g., hand gesture, body language, or facial expression such as smile, frown, or scowl), and may include typed or spoken words, menu selections, or selection of items on a display. A communicated message can effect a social transaction such as a greeting, farewell, insult, praise, flattery, flirtation, aggression, admiration, beckoning, affirmation or rejection; a question instantiating a form such as what, when, why, where, how, do you like, or do you dislike; a request for help such as "Where am I?", "Where are you?", "What can I do here?", "What can you do?", "How can you help me?", "What can I ask you?", or "What can I say to you?"; or a comment instantiating a form such as I like, I don't like, you like, you don't like. A communicated message can refer to biographical information of the agent or user such as name, age, mother, father, sisters, brothers, siblings, birthplace, job, hobbies, interests, preferences, birthday, sexual orientation, romantic status, marital status, email address, home address, friends, pets, or cleaning habits; a mood of the agent; a mood of the user; a chat topic; a behavior of the agent; a previously-made comment or message from the agent; a previous action between the user agent, either in an ongoing operation or a previous operation of the agent; a Web site; a visual, textual, or auditory display; or an application such as a search engine, e-commerce system, registration process or simulation. The communicated message can include a request for operation of an application or display or navigation assistance. Messages from the agent to the user may have similar content as described above for messages from the user to the agent.

[0386] Internal events of the agent that are part of a potential context include a change (increase or decrease) in the agent's mood or user's assumed mood by a specified qualitative magnitude (e.g., slightly, somewhat, more, much more, or completely) along an underlying mood dimension such as well-being, energy, arousal, extroversion, and introversion; performance, initiation, or completion of a speech act such as a comment, question, answer, or story by the agent; delivery of a message by the agent, including messages about previous user input or agent capability; initiation, performance, or completion of an action by the agent, such as display of an animation of the agent, operation of a browser or other application, or presentation of a menu or display; and an itinerary of the agent. In the case of an itinerary, the internal event can refer to one of the stops, interactions at the stop, an agenda of the stop, a step of the agenda, or an action of the step such as communication,

gesturing, changing mood, writing to a database, sending a browser command, running an application, or setting a precondition.

[0387] Internal states of the agent include moods of the agent or assumed moods of the user; or may refer to a message from the agent; an action of the agent, such as display of an animation of the agent, operation of a browser or other application, or presentation of a display or menu; or a itinerary of the agent. The state may signify that the agent is about to send or has just sent a message, or that the agent is about the perform or has just performed an action. The internal state can refer to arrival at or completion of a stop on the itinerary, interactions related to a particular stop, an agenda of the stop, interactions related to a step of the agenda, or actions of the agenda.

[0388] The agent editor described above is best implemented in the context of a run-time system. **FIG. 23** is a block diagram showing interaction among three units that are used together to author interactive agents and to generate run-time agent behavior. These three units are an agent editor **10**, an example of which is described in detail above; a configuration tool **12**; and an agent engine **14**. Agent editor **10** is a graphical user interface by which an author specifies the content **16** of a particular agent. The entered content is stored in an authoring database **18**, which is processed by configuration tool **12** to be in a format suitable to be used by agent engine **14**, shown in **FIG. 23** as a run-time database **20**. Authoring database **18** in which entered content **16** is stored may also be accessible by agent engine **14** without being processed by configuration tool **12**. Agent engine **14** then uses either authoring database **18** or run-time database **20** to generate interactive agent behavior **22**. One example of agent engine **14** is the Extempo ImpEngine, described in U.S. Pat. No. 6,031,549, issued to the present inventor, and herein incorporated by reference.

[0389] Content **16** is indexed in database **18** or **20** by the values of the state variables defining the context to which the content applies. Agent engine **14** retrieves content based on current values of the state variables and uses the retrieved content to control agent behavior **22**. As described above, state variables include the behavior of the user; the agent's run-time state, including current values of moods or preconditions; patterns in the agent's authored content, such as contingent responses to a yes/no question; the passage of time, for example to trigger the next behavior in a story or the next item on an agenda; or the behavior of an external application, such as a reply to a database query or an internet search. Behaviors may include dialogue, gestures, movement, transfer to a different location within a behavior script, changes in the values of preconditions or moods, sending an input to other applications, and sending of email or other network message.

[0390] It will be apparent to one of average skill in the art how to implement the agent editor using standard or custom-designed database software and graphical user interface development tools, based on the above description. The agent editor may be implemented on a wide variety of computer systems including distributed computer systems in which the different units of a run-time system are implemented on different computers. A typical computer system includes a central processing unit, data bus, ROM, and RAM. The system also includes I/O devices such as a visual display, a keyboard, a pointing device, and a microphone. The agent editor is typically stored as computer instruction code in the RAM or ROM for execution by the processor. The particular type of code will typically depend on the specific processor used, although the code may be machine-independent code that is executed by a virtual machine running on the processor.

[0391] It will be clear to one skilled in the art that the above embodiment may be altered in many ways without departing from the scope of the invention. Accordingly, the scope of the invention should be determined by the following claims and their legal equivalents.

What is claimed is:

1. A method for authoring content of a computer-controlled agent, said method comprising the steps of:

a) identifying a potential context of said agent for an author;

b) receiving a content for said agent in said potential context from said author; and

c) storing said content such that said content can be accessed by a run-time system that uses said content to control a behavior of said agent in an actual context, which occurs during an operation of said agent, wherein said actual context matches said potential context.

2. The method of claim 1, wherein said potential context comprises an input from a user during an operation of said agent.

3. The method of claim 2, wherein said input communicates a message.

4. The method of claim 3, wherein said message effects a social transaction.

5. The method of claim 3, wherein said message is a question.

6. The method of claim 3, wherein said message represents a request for help.

7. The method of claim 3, wherein said message is a comment.

8. The method of claim 3, wherein said message refers to an item selected from the group consisting of biographical information of said agent, biographical information of said user, a chat topic, a behavior of said agent, a received-message received from said agent, a Web site, a display, and an interaction between said user and said agent.

9. The method of claim 3, wherein said message refers to a mood of said agent.

10. The method of claim 9, wherein said mood comprises at least one of an emotion, a manner, an attitude, a style, and a feeling.

11. The method of claim 3, wherein said message communicates a mood of said user.

12. The method of claim 11, wherein said mood comprises at least one of an emotion, a manner, an attitude, a style, and a feeling.

13. The method of claim 3, wherein said message refers to an application.

14. The method of claim 13, wherein said application is selected from the group consisting of: a search engine, an e-commerce system, a registration process, and a simulation.

15. The method of claim 2, wherein said input communicates a gesture by said user.

16. The method of claim 2, wherein said input comprises at least one of typed words and spoken words.

17. The method of claim 2, wherein said input comprises a selection from a menu.

18. The method of claim 2, wherein said input comprises a selection of an item on a display.

19. The method of claim 1, wherein said potential context comprises an internal event of said agent.

20. The method of claim 19, wherein said internal event represents a change in an agent-mood of said agent.

21. The method of claim 20, wherein said change is of a specified magnitude.

22. The method of claim 20, wherein said change represents a change along a plurality of underlying mood dimensions.

23. The method of claim 19, wherein said internal event represents a change in an assumed user-mood of a user.

24. The method of claim 19, wherein said internal event refers to a performance of a speech act by said agent.

25. The method of claim 19, wherein said internal event refers to a message from said agent.

26. The method of claim 25, wherein said message refers to an item selected from the group consisting of a social transaction, biographical information of said agent, biographical information of a user, an agent-mood of said agent, an assumed user-mood of said user, a chat topic, a Web site, an application, an interaction between said agent and said user, an input of said user, and a capability of said agent.

27. The method of claim 19, wherein said internal event refers to an action of said agent.

28. The method of claim 27, wherein said action is selected from the group consisting of a display of an animation of said agent, an operation of a browser, an operation of an application, a presentation of a menu, and a presentation of a display.

29. The method of claim 19, wherein said internal event refers to an itinerary of said agent.

30. The method of claim 29, wherein said itinerary comprises a plurality of stops and said event refers to a particular stop from among said stops.

31. The method of claim 30, wherein said particular stop comprises an agenda and said event refers to said agenda.

32. The method of claim 31, wherein said agenda comprises a plurality of steps and said event refers to a particular step from among said steps.

33. The method of claim 32, wherein said particular step comprises a plurality of actions and said event refers to a particular action from among said comprised actions.

34. The method of claim 33, wherein said particular action is of a type selected from the group consisting of speech act, gesture, change mood, write to database, send browser command, run application, and set precondition.

35. The method of claim 1, wherein said potential context comprises an internal state of said agent.

36. The method of claim 35, wherein said internal state represents an agent-mood of said agent.

37. The method of claim 35, wherein said internal state represents an assumed user-mood of a user.

38. The method of claim 35, wherein said internal state represents a volume defined by a plurality of intervals on a corresponding plurality of underlying mood dimensions.

39. The method of claim 35, wherein said internal state refers to a message from said agent.

40. The method of claim 35, wherein said internal state refers to an action of said agent.

41. The method of claim 40, wherein said action is a selected from the group consisting of display of an animation of said agent, an operation of a browser, an operation of an application, a presentation of a menu, and a presentation of a display.

42. The method of claim 35, wherein said internal state refers to an itinerary of said agent.

43. The method of claim 1, wherein said potential context includes a plurality of elements.

44. The method of claim 43, wherein said plurality of elements includes a context element pre-defined for said author.

45. The method of claim 43, wherein said plurality of elements includes a context element defined by said author.

46. The method of claim 43, wherein said plurality of elements includes a context element predefined for said author and a second context element defined by said author.

47. The method of claim 1, wherein said potential context is identified for said author in a graphical interface.

48. The method of claim 47, wherein said graphical interface provides a labeled slot allowing said author to author said content by filling said slot with text.

49. The method of claim 47, wherein said graphical interface provides a menu of items allowing said author to author said content by selecting one of said items from said menu.

50. The method of claim 47, wherein said graphical interface provides a gesture table of gesture contexts, allowing said author to specify a particular gesture context in which a particular gesture can be performed by identifying a location in said gesture table.

51. The method of claim 50, wherein said gesture table includes a dimension representing a plurality of moods.

52. The method of claim 47, wherein said graphical interface provides an icon representing a function, allowing said author to author said content by selecting said function.

53. The method of claim 52, wherein said function specifies an interaction with an external system.

54. The method of claim 53, wherein said external system is selected from the group consisting of a browser, a database, and an application.

55. The method of claim 1, wherein said content enables said agent to deliver dialogue during an operation of said agent.

56. The method of claim 55, wherein said dialogue is authored explicitly by said author.

57. The method of claim 55, wherein said dialogue includes a variable, which may be replaced by a value selected from a specified group of alternative values.

58. The method of claim 55, wherein said content includes a specification of a manner of timing of said dialogue.

59. The method of claim 55, wherein said content includes a specification of a condition under which said dialogue is delivered.

60. The method of claim 55, wherein said content enables said agent to tell a story.

61. The method of claim 55, wherein said content enables said agent to ask a question of a user.

62. The method of claim 61, wherein said content enables said agent to deliver different dialogue depending upon said user's response to said question.

63. The method of claim 55, wherein said content enables said agent to choose among a plurality of alternative dialogue options.

64. The method of claim 1, wherein said content enables said agent to perform a gesture during an operation of said agent.

65. The method of claim 1, wherein said content enables said agent to change a mood during an operation of said agent.

66. The method of claim 1, wherein said content enables said agent to change a value of a precondition during an operation of said agent.

67. The method of claim 1, wherein said content enables said agent to interact with an external system during an operation of said agent.

68. The method of claim 1, wherein said content enables said agent to follow an itinerary, comprising a sequence of stops.

69. The method of claim 68, wherein said sequence of stops is influenced by an interaction with a user during an operation of said agent, as specified by said author.

70. The method of claim 68, wherein said sequence of stops is specified by said author.

71. The method of claim 68, wherein said sequence of stops is influenced by at least one of a value of a precondition, a mood, and information retrieved from a database.

72. The method of claim 1, wherein said content enables said agent to follow an agenda, comprising a sequence of steps.

73. The method of claim 72, wherein said sequence of steps is specified by said author.

74. The method of claim 72, wherein said sequence of steps is influenced by an interaction with a user during an operation of said agent, as specified by said author.

75. The method of claim 72, wherein said sequence of steps is influenced by at least one of a value of a precondition, a mood, and information retrieved from a database.

76. The method of claim 1 wherein said content is persona content.

77. The method of claim 1 wherein said content is application content.

78. The method of claim 1 wherein said agent engages in natural language conversation with a user, and wherein said potential context is potential conversation context, said content is conversation content, said behavior is conversation behavior, and said actual context is actual conversation context.

79. A method for authoring a computer controlled agent to play a specified role in interaction with a user, said method comprising the steps of:

a) identifying the logical structure of the interaction, comprising a sequence of interaction stages;

b) for each of said interaction stages, identifying the logical structure of the interactive behaviors of said agent and said user; and

c) for each of said logical structures of said interaction stages:

identifying a potential context of said agent for an author;

receiving a content for said agent in said potential context from said author; and

storing said content such that said content can be accessed by a run-time system that uses said content to control a behavior of said agent in an actual context, which occurs during an operation of said agent, wherein said actual context matches said potential context.

80. The method of claim 79, wherein said role is selected from the group consisting of a sales assistant role, a learning guide role, a customer service role, a messenger role, a survey administrator role, a web site host role, a game opponent role, and a marketing agent role.

* * * * *

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(54) **INTERACTIVE MULTIMEDIA CONTENT BUILDER**

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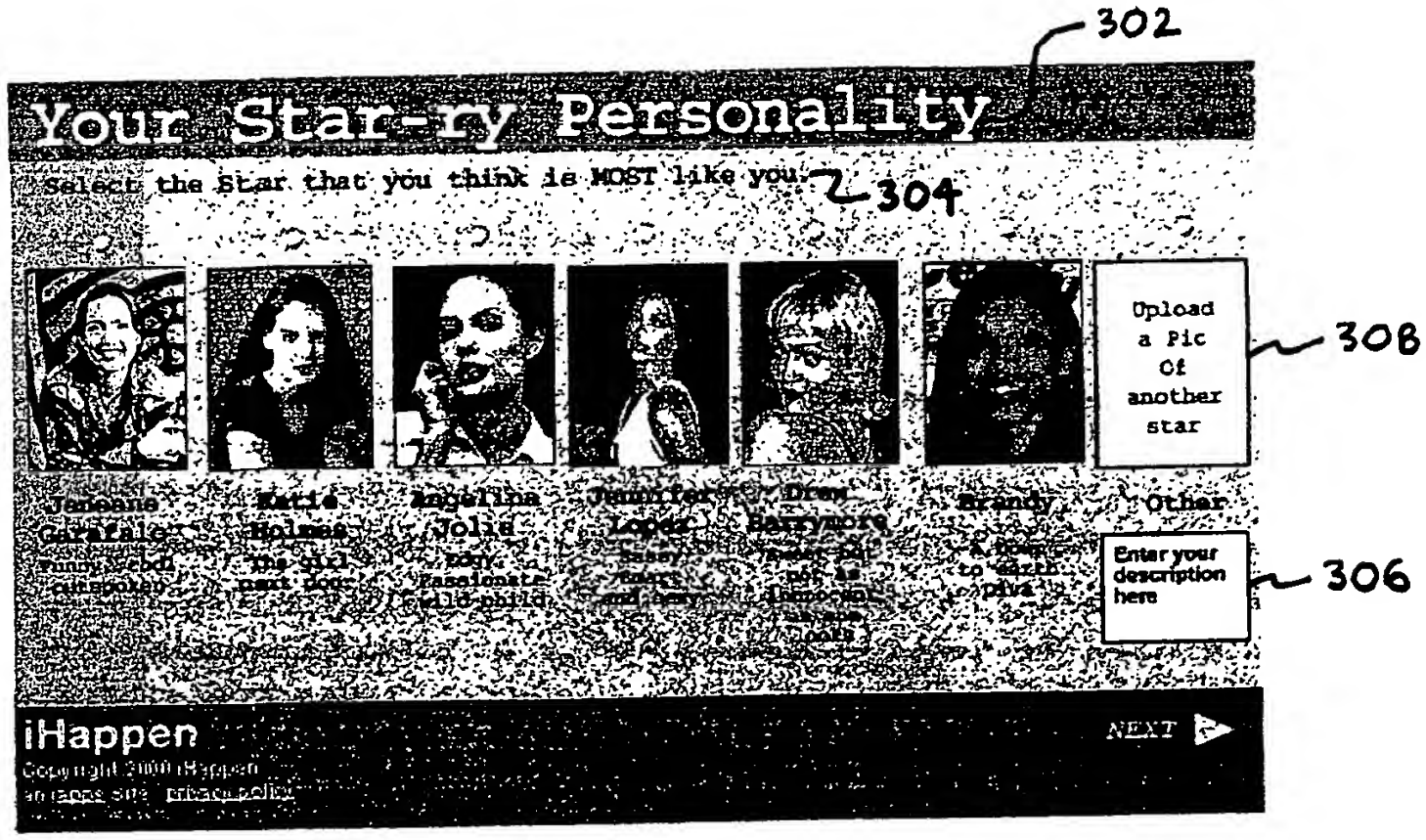
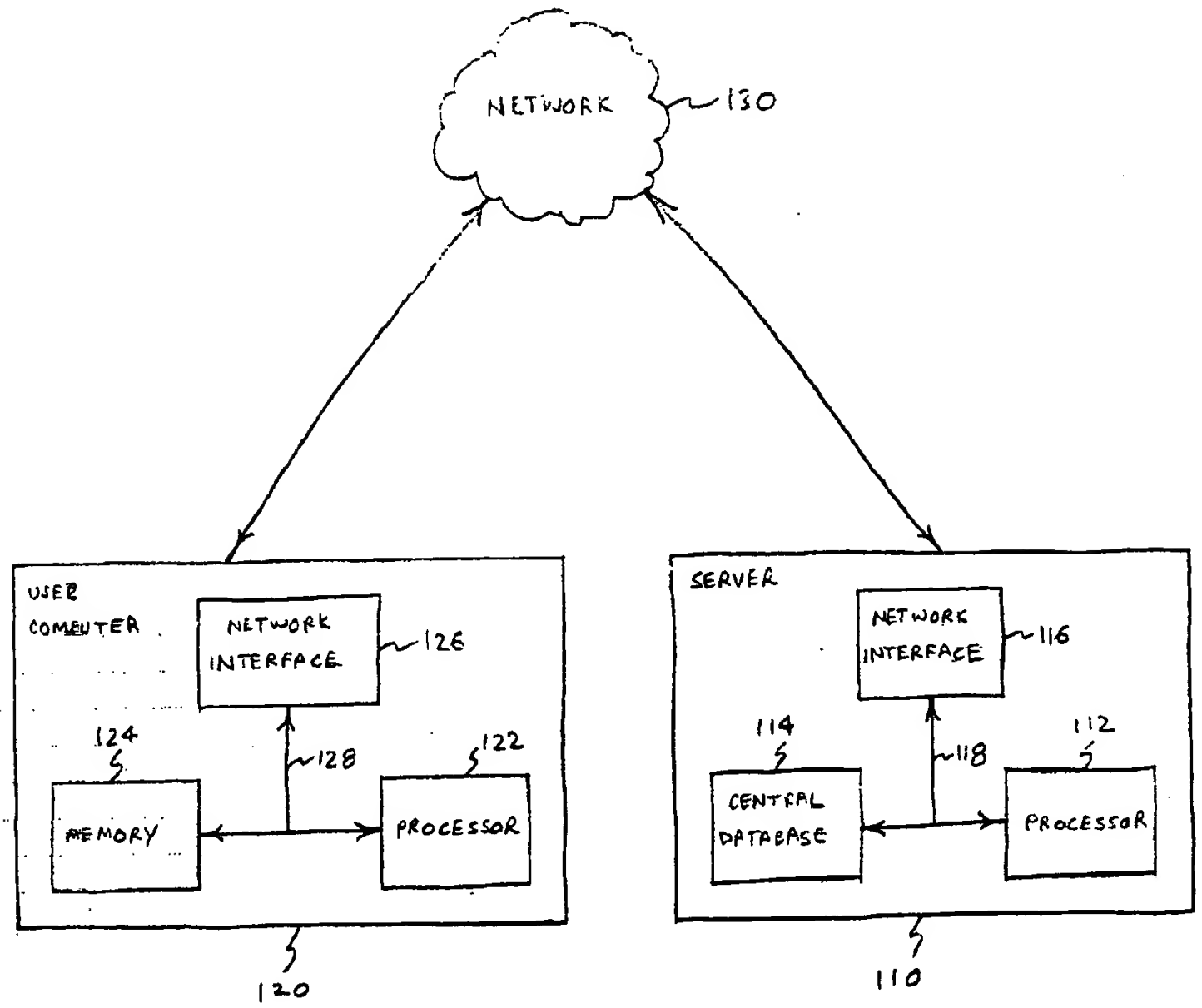
(52) **U.S. Cl.** **707/500.1**

(57) **ABSTRACT**

An apparatus, system and method for creating a personalized multimedia content using interactive multimedia applications. The method of the invention creates a personalized multimedia content by conducting an interactive online interview of a user, compiling data based on responses of the user, analyzing the compiled data to create the personalized multimedia content, and distributing the personalized multimedia content to a host or sponsor to facilitate marketing efforts. The marketing efforts include one-to-one marketing efforts, inventory controls, and resell of the personalized multimedia content with permission from the user. The personalized multimedia content can be created in real time. The personalized multimedia content can be customized to a specific market and commercial needs of the host or sponsor. The personalized multimedia content can increase online traffic, encourage repeat to the host or sponsor's site, and generate new revenue streams. The personalized multimedia content may be stored in a personal file or linked to related contents or events over the Internet via a Web site.

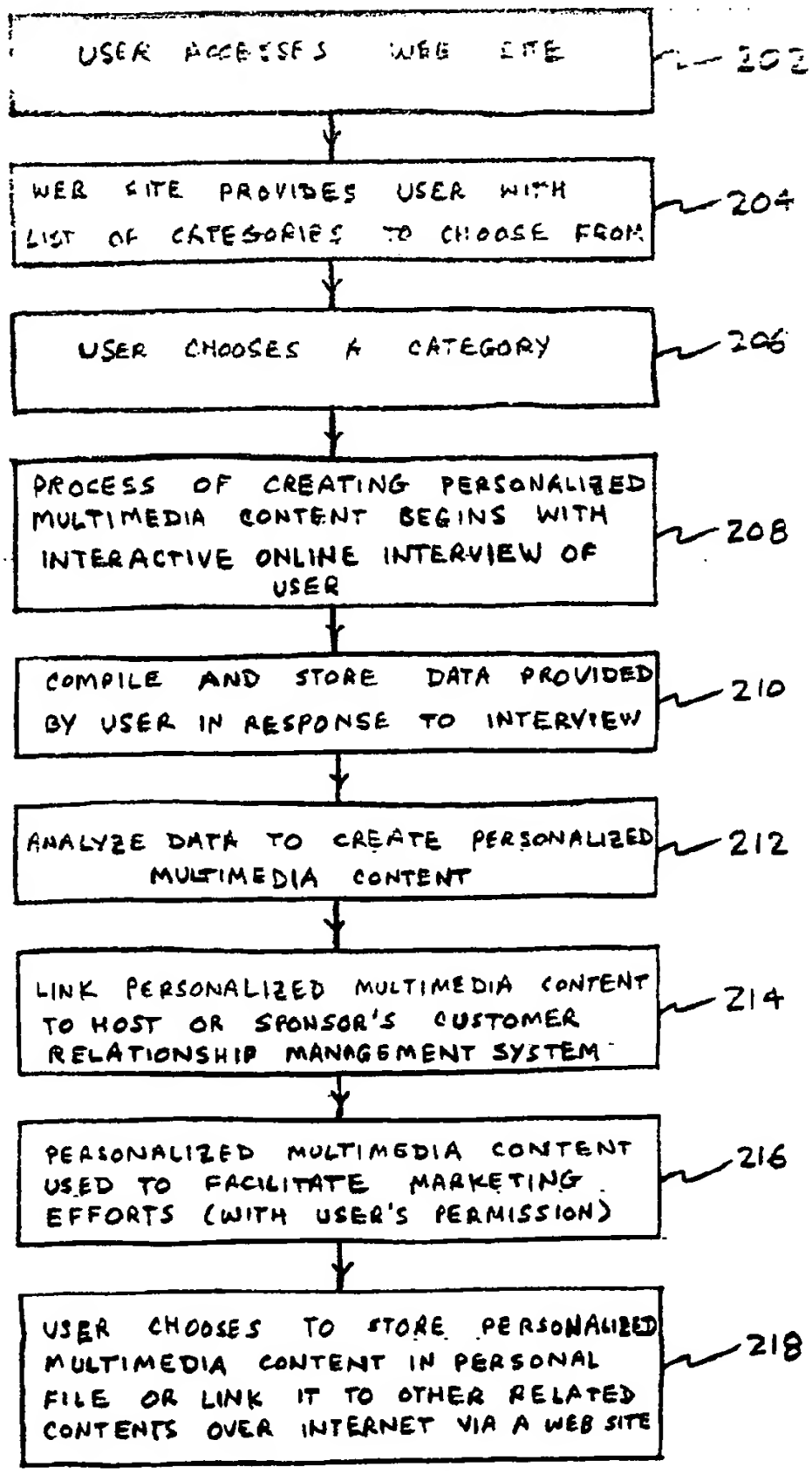


300


NETWORK
130
USER COMPUTER
NETWORK INTERFACE
126
124
128
122
MEMORY
PROCESSOR
120
SERVER
NETWORK INTERFACE
116
114
118
112
CENTRAL DATABASE
PROCESSOR
110

100

FIG. 1


USER ACCESSES WEB SITE
202
WEB SITE PROVIDES USER WITH LIST OF CATEGORIES TO CHOOSE FROM
204
USER CHOOSES A CATEGORY
206
PROCESS OF CREATING PERSONALIZED MULTIMEDIA CONTENT BEGINS WITH INTERACTIVE ONLINE INTERVIEW OF USER
208
COMPILE AND STORE DATA PROVIDED BY USER IN RESPONSE TO INTERVIEW
210
ANALYZE DATA TO CREATE PERSONALIZED MULTIMEDIA CONTENT
212
LINK PERSONALIZED MULTIMEDIA CONTENT TO HOST OR SPONSOR'S CUSTOMER RELATIONSHIP MANAGEMENT SYSTEM
214
PERSONALIZED MULTIMEDIA CONTENT USED TO FACILITATE MARKETING EFFORTS (WITH USER'S PERMISSION)
216
USER CHOOSES TO STORE PERSONALIZED MULTIMEDIA CONTENT IN PERSONAL FILE OR LINK IT TO OTHER RELATED CONTENTS OVER INTERNET VIA A WEB SITE
218

200

FIG. 2

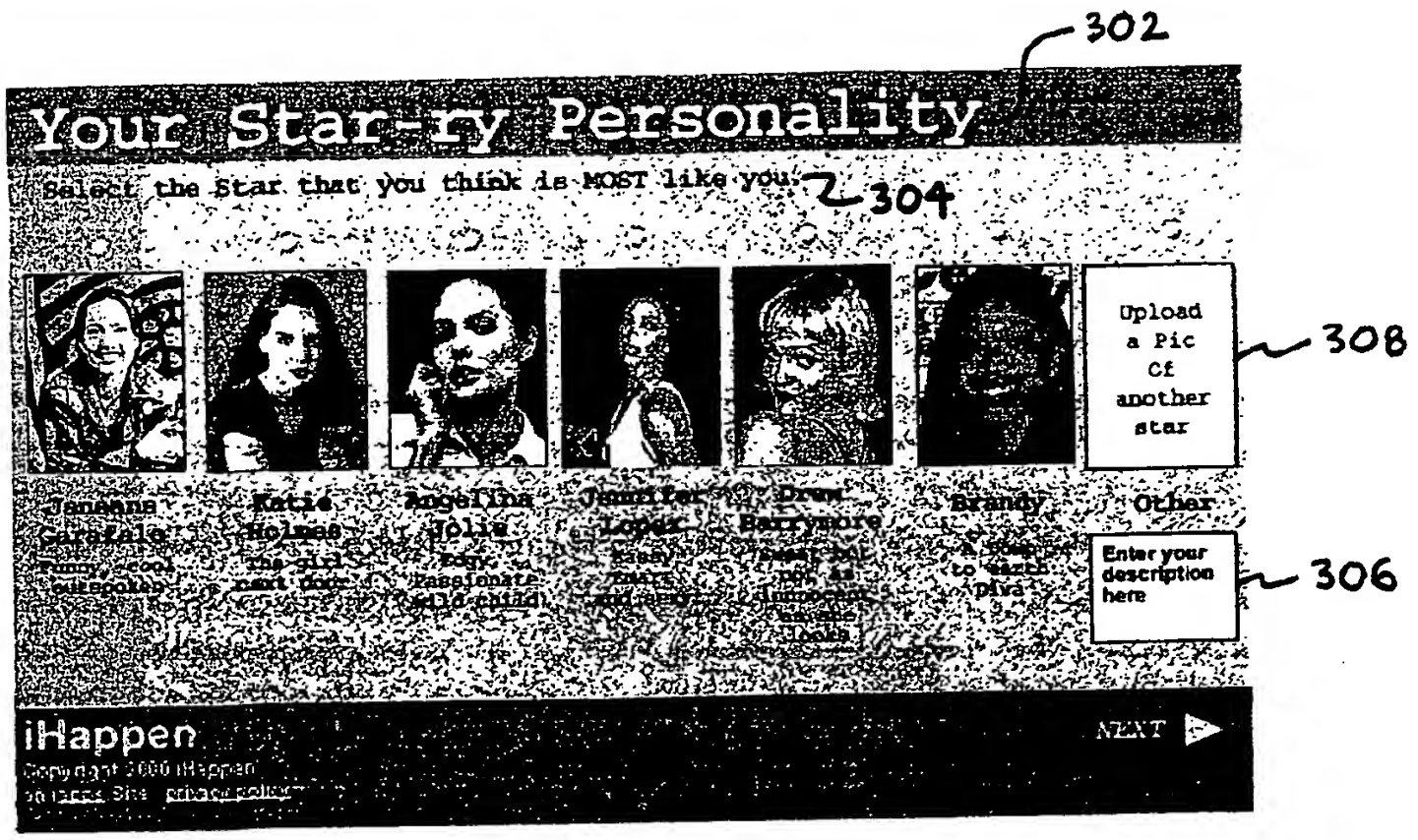

302
Your Star-ry Personality
Select the Star that you think is MOST like you.
304
Upload a Pic Of another star
308
Other
Enter your description here
306
iHappen
NEXT
300

FIG. 3


402
Question1: How would you describe him?
404
BACK NEXT
A. Coolest, hippest, baddest boy in town.
D. Muscle-bound hot jock with steaming cleats
412
B. Cuddley, wuddley, sweetie
E. Sensitive goth who knocks your socks off
414
C. Biggest brain in the room
F. Cute little freaky techno-geeky
416
Happen
Partner name/Logo
AN INTERACTIVE APPLICATION FOR A NEW GENERATION
400

FIG. 4

INTERACTIVE MULTIMEDIA CONTENT BUILDER

[0001] This application claims priority from U.S. Provisional Application Serial No. 60/223,976 filed Aug. 9, 2000. The entirety of that provisional application is incorporated herein by reference.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] This invention generally relates to computer-assisted interactive multimedia contents and, more specifically, to an apparatus, system and method for creating real-time personalized multimedia contents using interactive multimedia applications. The personalized multimedia contents may be stored in personal files or linked to related contents or events over the Internet via a Web site.

[0004] 2. Description of Related Art

[0005] Interactive multimedia application via the Web has become increasingly popular and is one of the fastest growing uses of the Internet. The Web generally operates on a client/server model; that is, a user (e.g., a client) runs a piece of software on his/her personal computer to use the resources of a host (e.g., server computer). The host allows many different users to access its resources at the same time and need not be dedicated to providing resources to a single user. In this model, the client software (e.g., a browser) runs on the user's computer, which contacts a Web server and requests information or resources. The Web server locates and then sends the information (e.g., text, audio, video, etc.) or resources to the browser, which then interprets the received information or resources and provides the results to the user's computer.

[0006] With interactive multimedia application, communication between a user and an application program (e.g., a browser) is symmetric. Consequently, large amount of multimedia data (text, audio, video, etc.) may be sent and received between the user and the application program. As a result, there are numerous potential uses of interactive multimedia application via the Web.

SUMMARY OF THE INVENTION

[0007] Exemplary embodiments of the invention include apparatuses, systems and methods for creating real-time personalized multimedia contents using interactive multimedia applications. The personalized multimedia contents may be stored in personal files or linked to related contents or events over the Internet via a Web site. Features of the invention include developing personalized merchandising opportunities, facilitating increased user interaction, and creating viral communication and enhanced traffic.

[0008] The personalized marketing tool includes a front end user interface, a back end database, and an end product, which is a personalized multimedia content.

[0009] The front end user interface allows a user, through multimedia prompts, to make various selections that are either prepackaged (multiple choice), or the user can make free expressions. These selections, for example, re-tell an event, create a new story, or merge a user's opinion with a product or service.

[0010] The back end database compiles, analyzes and stores all the answers (data) provided by the user. The compiled data can be reported to the host or sponsor of the tool in real time. The data provided by the user, for example, can be linked to and integrated with a sponsor's customer relationship management ("CRM") system. The data can be used to facilitate one-to-one marketing efforts, for inventory controls, or to be resold (with the user's permission).

[0011] The interactive multimedia applications of the invention allows the user to receive in real time, personalized multimedia content that can include, for example, personal images, video sound files, text and pre-selected graphics. This content is created dynamically and provided to the user via a link to a file that resides on a server of the invention. The user can reach that link through a unique uniform resource locator ("URL") and share that link with family, friends, etc., who can add content and create a multimedia end product.

[0012] The personalized multimedia content is not limited to a user and may be created for different groups of users, organizations, or any foreseeable application.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] The accompanying drawings, which are incorporated in and constitute a part of the specification, illustrate exemplary embodiments of the invention and, together with the detailed description of the invention, explain various aspects and principles of the invention. In the drawings:

[0014] **FIG. 1** is an illustration of an exemplary computer network on which a system and method for creating a real-time personalized multimedia content may be implemented in accordance with an exemplary embodiment of the invention;

[0015] **FIG. 2** is a flowchart illustrating a method for creating a real-time personalized multimedia content according to an exemplary embodiment of the invention;

[0016] **FIG. 3** is an exemplary "choose your personality" screen according to an exemplary embodiment of the invention; and

[0017] **FIG. 4** is an exemplary "my ideal soul mate" screen according to an exemplary embodiment of the invention.

DETAILED DESCRIPTION OF THE INVENTION

[0018] The following detailed description refers to the accompanying drawings that illustrate exemplary embodiments of the invention. Other embodiments are possible and modifications may be made to the exemplary embodiments without departing from the spirit and scope of the invention. Therefore, the following detailed description is not meant to limit the invention. Rather, the scope of the invention is defined by the appended claims.

[0019] The invention is directed to an apparatus, system and method for creating a real-time personalized multimedia content using interactive multimedia applications. The personalized multimedia content may be stored in a personal file or broadcasted over the Internet via a Web site.

[0020] As described herein, the utility of the invention extends beyond traditional interactive multimedia applications by enabling a user to create his/her own personalized multimedia content using interactive multimedia applications including an online interview. The online interview includes, for example, an actual voice moderator, an interviewer, a pre-programmed script, and a multimedia audiovisual moderator.

[0021] An example of the invention is it enables a user to celebrate and focus on his/her life experiences, interests, opinions, goals, aspirations, and fantasies. This is because people often like to talk about themselves and share their life events, experiences, thoughts and perspective with others. Based on this theme, the interactive multimedia applications of the invention capture the human spirit and create a personalized multimedia content of the user. The personalized multimedia content begins with a brief online interview of thought provoking and engaging questions. This interview prompts memory and inspires creativity that allows the user to tell his/her story in an engaging way. The invention provides the user with the tools to add photos, sound and video, and then to share that story with his/her family and friends, who can add their own thoughts and perspectives.

[0022] The personalized multimedia content may be distributed to a broad network of affiliates and partners in key demographic markets. The look and feel of the personalized multimedia content can be customized to a specific market and commercial needs of the sponsoring partners. For the partners, the personalized multimedia content builds traffic, encourages repeat visits to sponsors' sites, and generates new revenue streams.

[0023] **FIG. 1** is a diagram illustrating one exemplary computer network on which a system and method for creating a real-time personalized multimedia content may be implemented. As shown in **FIG. 1**, a computer network **100** may include a server **110**, a user computer **120**, and a network **130**, which may be or include a publicly accessible network, e.g, the Internet. The server **110**, which may be a single server or multiple server (a server farm, etc.), typically includes a processor **112** operatively coupled to a central database **114** and a network interface **116** via a communication/control bus **118**. The user computer **120** typically includes a processor **122** operatively coupled to a computer memory **124** and a network interface **126** via a communication/control bus **128**. Processor **122** executes program instructions stored in computer memory **124**, such as a Web browser program.

[0024] User computer **120**, by virtue of its connection to network **130**, may access and retrieve information stored at other computers coupled to network **130**. Server **110** may be a Web server, which is designed to accept information requests, e.g., via Web pages, from user computer **120** and to transmit requested information or resources back to user computer **120**. In other words, network **130** may provide access to Web sites that are supported by server **110**.

[0025] **FIG. 2** is a flowchart **200** illustrating the operation of one exemplary method for creating a real-time personalized multimedia content according to an exemplary embodiment of the invention. To begin, a user accesses a Web site supported by a server of the invention at **202** to create a real-time personalized multimedia content. The Web site provides the user with a list of categories to choose from at **204**. The list of categories includes, for example, how the user would describe his/her personality, how the user would describe his/her family, how the user would describe his/her soul mate, etc. At **206**, the user chooses one of the categories by clicking on the corresponding button on the computer screen, or speaking into the user computer.

[0026] Based on the user's chosen category (subject), the method of the invention begins creating a personalized multimedia content by conducting an interactive online interview using a voice moderator, an interviewer, a pre-programmed script, a multimedia audiovisual moderator, or any foreseeable method of interview at **208**. At **210**, the method of the invention compiles and stores all the data provided by the user in response to the interview at a back end database. The stored data (responses to questions during the interview) is then analyzed to determine the user's interests, opinions, goals, aspirations, fantasies, etc., thereby creating a personalized multimedia content at **212**. At **214**, the method of the invention links or distributes the personalized multimedia content to a host or sponsor's CRM system. The personalized multimedia content can be used to facilitate one-to-one marketing efforts, for inventory controls, or to be resold (with the user's permission) at **216**. The user has an option of storing the personalized multimedia content in a personal file, or linking it to other related contents or events over the Internet via a Web site at **218**.

[0027] A feature of the invention is it enhances and creates new revenue streams for customers, e.g., developing a stronger one-to-one marketing relationship. In one example, the invention provides a multimedia application for Blockbuster that enables its customers to create personalized multimedia movie reviews (or a personalized content that integrates a customer's own life with the thrill and excitement of the movies, such as a movie trailer). The invention application can be offered at Blockbuster stores from a kiosk or from a Web site. In this example, customers will want to complete the process for a number of reasons such as: it is an animated, voice hosted, and very interactive process; the process allows the customers to be stars in their favorite movies; the process allows the customers to be movie critics; and the process allows customers to create personalized multimedia contents in real time. The reviews by customers, for instance, can be shared with friends so as to create viral marketing. Furthermore, the application of the invention can easily be tied to a promotion such as "review/star in the last movie you rented and enter sweepstakes to win a movie each week for free for a whole year."

[0028] The benefits to Blockbuster are enormous. The invention compiles, stores and reports all the information provided by the customers in the context of building their reviews or personalized movie trailers. Blockbuster will be able to efficiently obtain incredible marketing data from its customers in real time. The stored data creates revenue in at least two direct ways. First, the data can be sold to movie studios and other companies hungry for what consumers are saying and thinking about their movies. The review template, i.e., the questions, prompts, and scenarios provided to the consumers can be designed in such a way as to elicit the most valuable information. Second, the data Blockbuster obtains can be used in one-to-one marketing efforts. For example, with the customer's permission, Blockbuster can use just the titles of the reviewed movies to suggest other related movies to the customer. In one hypothetical, a

customer hated the movie "Pearl Harbor," but his/her review gushed about Ben Afleck. Using this data, Blockbuster could "one-to-one" market Ben Afleck movies to that customer and advise that customer, by e-mail or postcard, of when a new Ben Afleck movie hits the stores.

[0029] It should be noted that these are just a few ways that the applications of the invention can enhance existing revenue streams for a business. It is foreseeable that a person of ordinary skill in the relevant art can think of countless other ways to create new revenue streams for a business by applying the applications of the invention.

[0030] Yet another feature of the invention is it can tailor the interview through various interactive techniques based on a user's response. For example, an online interview may include a pre-programmed script, with several different variations for individual responses to a specific question. A simple example would be a set of questions asked in an interview that would differ based on the sex of the individual user. Also contained within the scope of this invention is an artificial intelligence-like capability for generating unique multimedia content output.

[0031] **FIG. 3** illustrates an exemplary screen **300** in accordance with an embodiment of the invention where a user chooses "Your Star-ry Personality"**302**. In **FIG. 3,** a user answers questions about her personality in a variety of ways. In particular, answers to questions may involve selecting, for example, a "Star that you think is MOST like you"**304** from a menu of multimedia objects, such as selecting image files from a menu of stars available to play specific roles in the user's life story. Other answers may involve entering text in a box **306** ("Enter your description here"), or uploading video in a box **308** ("Upload a [picture] of another star"). As stated above, the user personality data is then compiled, analyzed, and stored to create the user's personalized multimedia content; the user's personalized multimedia content can be used to facilitate one-to-one marketing efforts and, with the user's permission, the personalized multimedia content can be resold to interested parties.

[0032] A person of ordinary skill in the relevant art will recognize that many permutations are contemplated by the invention. In particular, the invention provides tools to support other embodiments which may be especially appealing to specific demographic groups. For example, (1) teens may use the invention to produce an interactive magazine cover, (2) athletes may employ the invention to produce an interactive presentation of an athletic contest, such as a game or a race, (3) workgroups may use the invention to produce interactive business plans and other presentations, (4) organizations with recruiting needs, such as schools, businesses, social and political organizations may use the invention to produce interactive recruiting presentations, and (5) the romantically inclined may build a "Wanted Poster" for the date or partner of their dreams as illustrated in **FIG. 4**.

[0033] **FIG. 4** illustrates an exemplary screen **400** in accordance with an embodiment of the invention where a user chooses "My Perfect Guy"**402**. In **FIG. 4,** a user answers "Question 1: How would you describe him?"**404** by clicking on a letter corresponding to the description of that person, e.g., click on "A"**406** for the "Coolest, hippest, badest boy in town", "B"**408** for a "Cuddly, wuddley, sweetie" kind of guy, "C"**410** for the "Biggest brain in town", "D"**412** for a "Muscle-bound hot jock with steaming cleats", "E"**414** for a "Sensitive goth who knocks your socks off, and "F"**416** for a "Cute little freaky techno-geeky".

[0034] The above illustrations enhance sponsorship opportunities since users spend more time on each site completing the event or experience. In other words, each screen can be used to promote products and services, and create a range of opportunities for marketing and promotional activities based on the selections and preferences of the user. This results in increased traffic and duration of visits.

[0035] Another feature of the invention is a variety of types of user input may be used. Examples include uploading archival information from various sources, such as through licensed access to various libraries (e.g., photographs, famous speeches, maps, statistics, trivia) that users want to add to their personalized contents.

[0036] Yet another feature of the invention is input to the invention can be provided by several users, as in the example of a family using the tool to develop a family history or multi-generational life story, or a club, business, or other group developing its interactive output. In such cases, multiple users can provide input, and the output will be affected accordingly.

[0037] The invention also contemplates a variety of output from the multimedia development tool, including text, audio, and video, with each containing customized content. In other words, the output from the invention can vary according to the specific environment to which the invention is applied. For instance, the multimedia output of a user's movie-based life story will differ significantly from that developed by an enthusiastic user who wishes to chronicle a recent or hypothetical future chess game. Furthermore, each type of output generated by the creative tool of the invention can include embedded content that is specifically selected consistent with the user's preferences and input. For example, if a user wishes to prepare a movie-themed profile, his/her output may include a multimedia interview and commentary from a director whose specialty is consistent with the theme of the movie, such as Ivan Reitman or Mel Brooks for a comedic theme, or James Cameron for an action theme.

[0038] The invention may be further understood by reference to the additional examples of applications of the tools of the invention.

[0039] In one example, the invention adds a twist to journal writing and diaries which, of course, have been around for centuries. But new technology and particularly the proliferation of email make it easier than ever to document and share a user's life journey with family and friends and even a larger community, if the user chooses so. In particular, the invention makes the process even more fun and accessible. For instance, an online voice-prompted interview on a daily, weekly, or monthly basis could be provided to allow a user to build a journal, diary or memoir online on a regular basis. This interview facilitates the memory process and makes keeping a journal a whole new multimedia experience. That is, subscribers can add photos, sound files, and archival information from the Internet. The contents of the journal can easily be shared with friends and family; the user also has the option to post the journal online

or a bulletin board to facilitate "chat" and "community." The contents of the journal can also be compiled into a larger story or enhanced by, for instance, topical news stories, facts that relate to the user's experience and even music.

[0040] Another example of the application of the invention is a user's "fantasy and adventure." Everyone has dreams and fantasies and, seizing upon that basic human experience, the invention could build a dynamic and exciting interactive application that can nicely complement the invention's other offerings. In building an interactive fantasy application, e.g., "My Fantasy Vacation," a user would be prompted through a "voice-prompted" interview on what their fantasy vacation would look, feel and sound like. The tone, as with the other applications, would be fun, engaging and entertaining. Questions in the interview might include: location of the fantasy vacation (e.g., a secluded island in the Pacific, Paris, the South Pole); participants on the vacation (e.g., your spouse, family, mother-in-law, or current Hollywood star); entertainment for the trip (e.g., the user's favorite rock band, golf clubs, books, rock climbing equipment).

[0041] At the end of the interview, the invention would provide the user with a multimedia "travel poster" highlighting their responses and a story about their trip. This poster can be printed on just about anything ("My fantasy vacation to . . . ") and sent to family and friends or posted on a bulletin board to facilitate "chat" and "community."

[0042] Other similar fantasies and dreams include: automobiles (design your "fantasy car"); entertainment ("star in your own movie"); sports (a multimedia fantasy sports team; create a personalized team photo of a user's fantasy line-up with the user as a player or coach); and politics ("my run for the presidency" with the invention application building a multimedia campaign poster and brochure setting forth the user's platform).

[0043] In addition to being fun and engaging, the journal also serves as a great platform for promotional activities, marketing programs and targeting sales of products and services based on the stated preferences of the users.

[0044] Yet another example of a user's fantasy is "My Fantasy or Perfect Prom Experience." Here, the online event would ask questions and create scenarios such as: who would be my date; how would my date and I get to the prom; who would I go with; what would be the song of our first dance; what would I wear; what shoes would I choose; what make-up would I use, etc. After the user completes the event, he/she could create a video that would compile all the answers in a video that could be shared with friends and family. The event would be sponsored by various vendors (dress makers, make-up products, hair care products, etc.) and the data compiled would be sent to those vendors to create one-to-one marketing promotions or be used for inventory control. In this example, a vendor would know what it needs to order (e.g., dress style) in advance based on answers to the event questions. Moreover, the vendor could change their home page to feature a dress style that seems most popular at the moment.

[0045] The specification pages, including printed internet Web pages attached hereto, are representative examples of several elements of a preferred embodiment of the invention. They should not be construed so as to restrict the subject matter of the invention herein disclosed.

What is claimed is:

1. A method for creating a personalized multimedia content, comprising:

conducting an interactive online interview of a user;

compiling data based on responses of the user to the interview;

analyzing the compiled data to create the personalized multimedia content; and

distributing the personalized multimedia content to at least one of a host and a sponsor to facilitate marketing efforts.

2. The method of claim 1, wherein the marketing efforts include at least one of a one-to-one marketing effort, an inventory control, and a resell of the personalized multimedia content.

3. The method of claim 2, wherein the resell of the personalized multimedia content is done with permission by the user.

4. The method of claim 1, wherein the personalized multimedia content is created in real time.

5. The method of claim 1, further comprising integrating the personalized multimedia content with a customer relationship management (CRM) system of the host or the sponsor.

6. The method of claim 1, wherein the personalized multimedia content is distributed in key demographic markets.

7. The method of claim 1, wherein the personalized multimedia content can be customized to a specific market or commercial needs of the host or the sponsor.

8. The method of claim 1, wherein the personalized multimedia content can increase online traffic, encourage repeat to the host or sponsor's site, and generate new revenue streams.

9. The method of claim 1, further comprising linking the personalized multimedia content with existing related contents or events.

10. The method of claim 1, wherein the creation of the personalized multimedia content stage enhances sponsorship opportunities by at least one of promoting products and services, and creating marketing and promotional activities based on the compiled data.

11. The method of claim 1, wherein creation of the personalized multimedia content is driven by at least one of an event, a product, and a survey.

12. The method of claim 1, wherein the interactive online interview is voice hosted.

13. The method of claim 1, wherein the interactive online interview is conducted by at least one of a voice moderator, an interviewer, a pre-programmed script, and a multimedia audiovisual moderator.

14. The method of claim 13, wherein the pre-programmed script includes different variations based on the user's response to a specific question.

15. The method of claim 1, wherein output of the personalized multimedia content includes at least one of a text output, an audio output, and a video output.

16. The method of claim 1, wherein the personalized multimedia content is stored in a personal file.

17. The method of claim 1, wherein the personalized multimedia content is linked to a Web site.

18. The method of claim 17, wherein the personalized multimedia content can be shared by others including family and friends by accessing the Web site.

19. The method of claim 18, wherein the family or friends can add their own thoughts or perspectives to the personalized multimedia content.

20. The method of claim 1, wherein the interactive online interview involves at least one of entering text, uploading video, uploading audio, uploading graphic content, uploading archival information, and selecting from a menu of multimedia objects.

21. The method of claim 20, wherein the archival information includes at least one of a licensed access to a photograph, a famous speech, a map, and any information that the user may want to add to the personalized multimedia content.

22. A method for creating a business plan among workgroups, comprising:

conducting an interactive online interview of each of the workgroups using a pre-programmed script;

developing a profile for each of the workgroups based on responses by the workgroups to the pre-programmed script; and

creating the business plan based on the profiles of the workgroups.

23. A server operating in a network environment, comprising:

an interface that outputs information to and receives information from a user;

a database, operationally coupled to the interface, for storing computer readable instructions; and

a processor, operationally coupled to the interface and the database, for executing the computer readable instructions to create a personalized multimedia content of the user.

24. A system for creating an interactive personalized multimedia content, comprising:

a computer for a user to request and access information via a network in order to create the personalized multimedia content;

a server for executing computer readable instructions to create the personalized multimedia content; and

the network, operationally coupled to the computer and the server, for providing communication between the computer and the server.

25. The system of claim 24, wherein the personalized multimedia content is created in real time.

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